ANTARCTIC BIBLIOGRAPHY

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Introduction

This volume is the fourteenth in a continuing series of compilations presenting abstracts and indexes of current Antarctic literature published since 1962. A companion volume to the series, *Antarctic Bibliography, 1951–1961,* extends the coverage retrospectively.

The material has been compiled over a period of eighteen months; the cut-off date for inclusion in this volume was June 1985. To provide current awareness, the abstracts have also been distributed as monthly bulletins under the title *Current Antarctic Literature.* The bulletins are generated from a computerized data base which is also used in producing this cumulated listing and the indexes.

The present volume contains abstracts numbered from 28,962 to 31,756; these first appeared in issues no. 137 through 154 of *Current Antarctic Literature.* The first five volumes each contained 2,000 abstracts. Thus, items 1–2,000 appeared in volume 1 (published in 1965), items 2,001–4,000 in volume 2 (1966), items 4,001–6,000 in volume 3 (1968), items 6,001–8,000 in volume 4 (1970), and items 8,001–10,000 in volume 5 (1971). Volume 6 (1973) contained items 10,000–12,244, volume 7 (1974) items 12,245–14,447, volume 8 (1976) items 14,448–16,899, volume 9 (1977) items 16,900–19,248, volume 10 (1979) items 19,249–21,721, volume 11 (1980) items 21,722–24,083, volume 12 (1982) items 24,084–26,452, and volume 13 (1983) items 24,453–28,961.

The material is arranged in sections representing thirteen subject categories (see table of contents). Items that apply to two or more categories are listed in one section only and cross-referenced at the end of the other pertinent sections. Because of this scheme of arrangement, some items dealing with the same subject (from different aspects) will be found in two different categories; e.g. while most items on krill are listed in section B, Biological Sciences, some appear in section A, General, because of their emphasis on catch and processing technology. Within each section, abstracts are arranged by accession number; the indexes are keyed to these numbers.

Foreign-language titles are given in English translation first, with the original title following in brackets. Transliteration of Cyrillic and romanization of oriental languages follow the Library of Congress systems. Some of the citations are followed by library call numbers, preceded by the library symbols commonly used in union catalogs.

As a rule, the abstracts are informative rather than descriptive, but no attempt is made to verify or critically evaluate the author's statement or conclusions. Author abstracts are either used unchanged or modified for the sake of brevity or conformity to guidelines adopted for this bibliography.

Four indexes are provided: (1) an author index that includes coauthors (anonymous journal articles are referred to under the journal name); (2) a subject index that occasionally extends to two levels of subheadings; (3) a geographic index that contains names of places, stations, and geographic features as approved by the U.S. Board on Geographic Names; and (4) a grantee index to names of organizations or institutions that received financial support from the National Science Foundation for work that resulted in publications abstracted in the volume. In each index, entries are cited by a letter, indicating the subject category, followed by the accession number; for example, B–31745 refers to section B, Biological Sciences, item number 31745.

Although the majority of the publications abstracted are in the collections of the Library of Congress, many significant items were lent by or exchanged with other institutions, made available by the Division of Polar Programs of the National Science Foundation, or received as review copies or reprints directly from publishers and authors. Because they contribute to more current and complete coverage, review copies and reprints are especially valuable, and publishers and authors are encouraged to send them to the Library of Congress, Science and Technology Division, Cold Regions Bibliography Project, Washington, D.C. 20540, U.S.A.

Requests for photoreproductions of documents cited in this bibliography, except material protected by copyright, should be directed to the Library of Congress, Photoduplication Service, Dept. C-177, 10 First Street SE., Washington, D.C. 20540. U.S. government or government-sponsored technical reports may, in most cases, be obtained from the National Technical Information Service, Springfield, Va. 22151. For such reports, NTIS order numbers are usually included in the bibliographic citation.

Geza T. Thuronyi, *Head*
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

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A. GENERAL

A-28985

Scientific Committee on Antarctic Research, **SCAR bulletin, No.75, September 1983,** *Polar record,* Sep. 1983 21(135), p.623-635, Includes Fourth BIOMASS progress report by S.Z. El-Sayed, q.v.

The report of the SCAR executive meeting in June 1983 consists of items on the meeting agenda. These include: the executive response to Uraguay's application for membership as a consultative party of the Antarctic Treaty; reports from working groups in geodesy and cartography, glaciology, and solid earth geophysics, and biology; reports from groups of specialists on mineral exploration and exploitation and living resources of the southern ecosystems; a proposed new group of specialists on antarctic sea ice; liaison with ICSU and COSPAR; draft UNEP/FAO plan for marine mammals; SCAR observers to attend CCAMLR meetings; XVIII (1984) and XIX (1986) SCAR meeting places changed to Bremerhaven and South Africa, respectively. Also included are a report on Working Group on Human Biology and Medicine, a list of acronyms, and a list of 1983 winter operating antarctic stations, with map.

A-28990

U.S. National Science Foundation, **Antarctic Journal of the United States, Vol.18, No.3,** Washington, D.C., Sep. 1983, 24p.

Planned programs on the West Antarctic ice sheet and marine ecosystems are highlighted. Summaries of other planned research and names of principal investigators are given in the disciplines of marine biology, medical sciences, terrestrial biology, earth sciences, glaciology, ocean sciences, and lower and upper atmosphere studies. A further breakout is given by location and project title. Sites include Antarctic Peninsula, James Ross Island, Weddell Sea, Scotia Sea, Indian Ocean, Mid-Atlantic Ridge, Siple Station, Siple Coast, Marie Byrd Land, McMurdo Station, Victoria Land, Amundsen-Scott Station, and remote or multiple stations. A listing is given of Navy, Coast Guard, contract and other services. Announced are change of command and a safety award for VX-6 and NSF funding awards for antarctic projects from Apr. 1 to June 30, 1983. Weather summaries for May, June, and July 1983 at U.S. stations are given.

A-29006

U.S. National Science Foundation, **United States antarctic program: study report for Office of Management and Budget,** Washington, D.C., May 1, 1972, 152p., 2 refs.

In 1971 OMB requested NSF to examine the reasonableness of antarctic research support costs provided by DOD and costs of alternative support sources; sensitivity of support costs to changes in science research and changes in research costs; and six related items. Using the criterion of maintaining an "active and influential [U.S.] presence" in Antarctica, NSF concluded that support costs provided by DOD were generally reasonable and that commercial support alternatives offered little in way of cost savings. Costs could be substantially reduced if the stations operated were coastal stations. This approach would sharply reduce the types and quality of research and would not meet the criterion of an "active and influential" presence. (Auth. mod.)

A-29026

Australia. Department of Science and Technology. Antarctic Division, **Antarctic Division annual review 1982-83,** Canberra, 1983, 27p., Refs. p.25-27.

The review presents the state of the Australian presence in Antarctica. Policy aims are stated and program increase requests are outlined including an annual marine-biology research cruise; an annual marine-geoscience research cruise; an annual onshore major summer field program; small increases in several research programs; and restoration of Mawson's Hut. Major research accomplishments are noted in oceanography, zooplankton; seals, bathymetry, ship- and land-based ornithology, botany, limnology, glaciology, upper atmospheric physics, and medical research. Proposals and activities in transportation, building construction, equipment, and communications are given. Appendices list senior staff, committee representatives, resupply voyages, wintering personnel 1983, summer field parties 1982-83, and publications.

A-29050

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.32,** Kingston, Tasmania, Dec. 1983, p.141-160.

Because of an extremely tight shipping schedule for resupplying Australian antarctic bases, Australia has reluctantly withdrawn from participation in SIBEX-1. Limitations on funding prevented chartering another vessel and another alternative would have risked an extended besetting near the end of the supply period. Other items include: the Australian Conservation Foundation calling for declaring Antarctica a World Park and banning any exploitation of natural resources there; a senior lecturer at the University of Tasmania urging more social science research about Antarctica to resolve problems in exploiting Antarctica's natural resources; a diagram of the runway support camp at Casey; a progress report in the ANARE study of Vanderford Glacier; seven pages of recent Australian antarctic publications; brief reports of the antarctic activities of other nations; short general news bits about Antarctica and people involved in or with Antarctica. November climate summaries for Mawson, Davis, Casey, and Macquarie Island are included along with events scheduled for 1984 and beyond. The expeditioners are working their ways out of hibernation, basking in the warmth and diminished winds of November, and otherwise enjoying the rites of spring, Antarctic style.

A-29106

Kertz, W., **Georg von Neumayer and polar research** [Georg von Neumayer und die Polarforschung], *Polarforschung,* 1983 53(1), p.91-98, In German with English summary. 17 refs.

The article describes the life of Georg von Neumayer (1826-1909) for whom the antarctic research station of the Federal Republic of Germany is named. Special attention is given to his participation in the realization of the First International Polar Year 1882-83 and his commitment to the exploration of the Antarctic. (Auth.)

A-29109

New Zealand Antarctic Society, **Antarctic, Vol.10, No.3,** Christchurch, Sep. 1983, p.82-120.

Among New Zealand plans for its 1983-84 antarctic season are included: seabed drilling in McMurdo Sound at New Harbor as part of the CIROS project (Cenozoic Investigations of the Ross Sea); a study of Hallett Station to determine if it can be restored as a scientific station; a remote geological program in the Ohio Mountains; monitoring nine dry valleys; numerous summer programs involving more than two hundred men and women; Granite Harbour sediment studies; United States plans and programs are identified and outlined as are those of the Australians who plan to buy a marine research ship. Activities of the crew aboard the Dick Smith Explorer, beset for six months in Prydz Bay, are described. A diverse set of programs of the British Antarctic Survey is noted and the West German project on the Filchner-Ronne Ice Shelf is a major effort. The Soviets with two naval research vessels completed a hydrographic circumnavigation of the continent. A controversy arose from a plan to cover Discovery Hut with a plastic geodesic dome.

A-29161

Kohnen, H., comp, **Antarctic expedition of the MS *Polarbjörn* 1982/83 (summer season at Atka Bay and the Kraul Mountains)** [Antarktis-Expedition von MS *Polarbjörn* 1982/83 (Sommercampagne zur Atka-Bucht und zu den Kraul-Bergen)], *Berichte zur Polarforschung,* Aug. 1983 No.13, 79p., In German with English summary. For individual papers see: 38-1662 through 38-1665 or B-29164, D-29162, E-29163, F-29166, F-29169, I-29165, I-29167, I-29171, K-29168 and L-29170.

An account of the expedition is given in 11 papers covering research activities to, from, and on the ice. Research was conducted on the following topics: physical oceanography; geology; parasitology; surface level thermal inversions; heavy metals; trace materials in the atmosphere and firn; VLF measurements; glacial engineering; and surface layer ozone.

A-29193

Gentz, J., **Antarctica: big chill or big deal,** *American Association of Petroleum Geologists. AAPG Explorer,* Jan. 1984 6(5), p.1, 16-17.

A general review of antarctic oceanographic, geographic and geological knowledge obtained during past explorations and scientific research, is presented. Reviewed also are current involvement of various nations in antarctic territorial claims, plans for future studies and possibilities of exploitation of mineral resources.

A-29194

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.33,** Kingston, Tasmania, Jan. 1984, p.1-8.

Reported in this issue are: the U.N. study of Antarctica resulting from a resolution adopted by the General Assembly Dec. 15, 1983 will cover all aspects of the region "taking into account the Antarctic Treaty system and other relevant factors;" floor plans for the new living/working quarters at Mawson; Dec. 1983 climate summaries for the antarctic stations; and a list of upcoming events and scientific meetings. The wintering parties are entertaining many visitors as they prepare to leave the stations in the good hands of their successors.

A-29224

Akademie der Wissenschaften der DDR. Wissenschaftliches Komitee für Antarktisforschung, **Antarctic research activities of the German Democratic Republic, report to SCAR no.4, record of activities December 1981-October 1983, planned activities October 1983-October 1984,** Berlin, 1983, 15p., 36 refs.

The GDR report to SCAR includes a membership roster of the Committee giving each individual's discipline and academic affiliation; past and planned activities showing research working areas, period of work, and specific projects in aurora, geomagnetism, ionosphere, meteorology, geology, geodesy (geography), environmental isotopes, and biology; and a list of publications resulting from the research.

A-29226

Zakhariev, V.I., **Antarctica: politico-economical handbook** [Antarktida: politiko-ikonomicheski spravochnik], Sofia, Partizdat, 1982, 133p., In Bulgarian. 4 refs.

The book reviews the climate and the geographical position and characteristics of Antarctica, including mountain ranges, ice sheets and glacier dimensions, which are tabulated. Reviewed are also the flora and fauna of the continent and of the waters surrounding it. Natural resources, including mineral, biological and recreational, are also discussed, as are the history of antarctic discovery and and research. The fourteen articles of the Antarctic Treaty are summarized, and its international character, as defined in article 13, is pointed out. The dates in which different nations—availing themselves of of the rules specified in article 13—became members are reviewed, starting with Poland, June 1961, and ending with Bulgaria who, by joining in July 1978, became the twentieth signatory of the Treaty. Prior to that Bulgaria's participation in antarctic research was limited to joining Soviet expeditions to Antarctica. Stations representing the different nations in Antarctica are listed.

A-29239

SCAR Group of Specialists on Antarctic Climate Research, Allison, I., ed, **Proposals for the implementation of a programme of antarctic research contributing to the world climate research programme,** Nov. 1983, 65p.

In reviewing broad areas of required research several current deficiencies in understanding, technology, and data are identified. Among them are: lack of a management plan for an antarctic data base; lack of knowledge of trace gas and aerosol concentrations; lack of understanding of precipitation isotopes, ice crystals, and clouds; knowledge gaps in relationships between atmosphere and core measured parameters; determination of the geographical origin and age of deep ice; techniques should be improved for drilling and extracting high quality ice cores; data shortages in atmospheric dynamics and physics; sea ice dynamics; lack of observations of sea ice processes of formation and decay; remote sensing data gaps. Recommendations for high priority research are made addressing these deficiencies and other problem areas either directly or by implication.

A-29279

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.34,** Kingston, Tasmania, Feb. 1984, p.9-30.

In this issue are reports of: the 12th ATCM moving to tighten environmental protection and broaden distribution of documents generated at the ATCMs; Mawson observing its 30th year as an antarctic research station; SATCOM equipment goes into operation in January; damage to ships and disruption of antarctic shipping schedules; three additional automatic weather stations deployed to measure katabatic winds; a new SAR Hagglund scheduled for delivery to Casey; citations of recent Australian antarctic publications; the annual weather summaries for Mawson, Casey, Davis, and Macquarie for 1983 and the monthly summaries for Jan. 1984; the death of Eric Webb last surviving member of Mawson's 1911-14 Australasian Antarctic Expedition; and scheduled coming events for 1984 and a few for 1985, 1986, and 1988. Wintering crews are settling in preparing to carry on alone as the summer parties gradually thin out.

A-29288

Alaska. University. Geophysical Institute, **Annual report,** Fairbanks, 1983, 254p., Publications, p.197-211.

Following comments by the Director and a discussion of urban climates in Alaska, a general overview of the Institute is given, describing its research and training purposes, its history, areas of interest, physical plant and facilities, associations with other institutions having similar interests, and its antarctic activities. Brief summaries are given of specific research projects showing grant/contract agencies and account numbers and the scientific personnel involved in each project. The summaries cover space research, aeronomy, climatology, meteorology, glaciology, geology, solid earth physics, and applied science. Five of the summaries deal with research in Antarctica and in subantarctic regions.

A-29290

British Antarctic Survey, **Annual report, 1982-83,** [Cambridge, Eng.], Natural Environment Research Council, 1983, 63p., Publications 1982-83 p.54-59.

DLC QH84.2.B 73a

General remarks are made concerning finance, staffing, and organization, new equipment, completed construction, interruption of activities at South Georgia and the Falklands. Personnel awards are announced; activities in the United Kingdom, distinguished visitors, and British and international meetings attended are listed. A general resumé of antarctic activities is given for the 1982 winter, 1982-83 summer, aircraft and ship operations, and the 1983 winter. Scientific programs are reviewed in substantial detail in solar-terrestrial physics; studies of the ionosphere; meteorology and climatology; chemistry, radiation, and dynamics of the atmosphere; geology; field geophysics; glaciology; mapping; marine biology; bird and seal biology; terrestrial biology; and medical research. Included also are lists of visitors to the various divisions, publications for 1982-83, and staff at the various locations, divisions, and ships. A map showing the British antarctic stations manned during 1982-83 closes the report.

A-29303

Stehberg L., R., **Terra Australis Incognita: a new route of archaeological investigation** [Terra Australis Incognita: una ruta de investigación arqueológica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.77-86, In Spanish with English summary. 15 refs.

History of Antarctica, and various hypotheses concerning the possibility of human habitation on that continent and the surrounding islands at some point in the past, are reviewed in connection with two projectile points supposedly found in the vicinity of the South Shetland Islands.

A-29309

Jahn, I., **Antarctic challenge: report on the interdisciplinary symposium during the "Kieler Woche" 1983,** *Meerestechnik,* Nov. 1983 14(4), p.129-133, In English with German summary.

Antarctic research is one of the examples for successful long term international cooperation. However, now the question is raised whether harmony will be maintained in the face of expected profitable mineral resources and the Third World's demands for participation in the Antarctic Treaty system. The answer to this question will depend to a considerable extent on the future behavior of the Antarctic Treaty Parties. The symposium in Kiel offered an international forum for information and discussion of these matters. Natural scientists, diplomats and international lawyers there had an opportunity to consider possibilities for a further extension of the legal regime of Antarctica, that are both politically and legally feasible as well as being acceptable to the scientific community interested in further research in the Antarctic. (Auth.)

A-29311

German Democratic Republic. Wissenschaftliches Komitee für Antarktisforschung, **Research activities of the German Democratic Republic in the Antarctic in 1959-1982,** Potsdam, 1982, 48p., In German and English. Includes 20p. of color photographs.

As happened with most nations concerned with antarctic research, the IGY of 1957-1958 was the event which gave impetus to the research programs of the GDR. These were carried out independently, aided by full logistics support from the Soviet Antarctic Expedition. The programs include work in meteorology, glaciology, upper atmosphere, geodesy, cartography, solid earth geophysics, geology, antarctic ecosystem, marine biology, medicine, bioclimatology, and physiology.

A-29362

Trial in Antarctica: antarctic research of the German Democratic Republic [Bewährung in Antarktika: Antarktisforschung der DDR], Leipzig, Brockhaus, 1982, 220p., In German.

In 16 chapters, the expeditioners who spent time on the ice recount in various ways the East German experience in antarctic research as part of the Soviet Antarctic Expeditions. Beginning with SAE 5, 1959-1961 and continuing through SAE 26, 1981-1982 (less SAE 9, 11, 12, 15, 16, and 18), the scientists who participated in the SAEs present their reminiscences of the events they witnessed. They tell of the spectacular natural beauty of Antarctica; the harsh, frigid climate; bright stars shining in the wintry darkness; nunataks on ice sheets; the people who were with them; the research programs involving a broad spectrum of disciplines; the traverses; the IGY; the Antarctic Treaty; the scientific observatories; the food, the living conditions, and the loneliness; but especially of the scientific endeavors and the dedicated scientists who labored in the unforgettable and unforgiving cold.

A-29401

Portrait of Antarctica, London, George Phillip, 1983, 168p.

This pictorial description of Antarctica includes both recent and older photographs, in color and in black and white, and provides a record of the changes in man's activities, equipment, and range in the Antarctic over last fifty years. Following a foreword by HRH the Prince of Wales, there are chapters on the Hostile Land (mountains, snow, and ice), Going South (ships, equipment, and sea ice), Home from Home (the stations), Travelling Overland (sleds, dogs, skidoos, and crevasses), Life in the Field (tents, sleds, and measuring), In the Air (aircraft working on the ice) Wildlife (penguins, seals and flying birds). The photographers are Launcelot Fleming, Kevin Walton, Jim Bishop, Jonathan Walton, and Paul Goodall-Copestoke.

A-29404

Australia. Department of Science and Technology. Antarctic Division, **Annual review 1982-83,** Canberra, 1983, 27p., Publications list p.25-27.

Following brief statements of the functions, policy, and international activities of the Antarctic Division and Department of Science and Technology, the research program is reviewed. Highlights of the international aspects included participation in the deliberations on the agenda for the 12th Antarctic Treaty consultative meeting and the coming into force of the Convention for the Conservation of Antarctic Marine Living Resources with Australia becoming depository nation for the Convention. This entailed the establishment of a Commission, headquartered in Hobart, to administer the Convention. A senior officer of the Department of Science and Technology was elected its first executive secretary. Summaries of various facets of the research program show diverse activities in marine science, upper-atmosphere physics, cosmic-ray physics, and medical research. Summaries are also given of plans for the new transport system, shipping, unloading, air transport, and new construction at the antarctic stations. Appendixes show Australian representation on committees, ANARE voyages, lists of wintering and summer personnel, and publications.

A-29412
Mocellin, J.S.P., **Antarctica: the sixth continent** [Antártida: o sexto continente], São Paulo, Olivetti do Brasil S.A., 1982, 77p., In Portuguese. Refs. p.77.

The geological and socio-political history of Antarctica, its geography, climate, biological and mineral resources and their potential for exploitation are reviewed and illustrated by numerous photographs. Maps show the human presence in Antarctica from 1800 to 1956. The ongoing scientific research, the Brazilian participation in it and the role Brazil plays in the Antarctic Treaty, are discussed.

A-29432
Indian Expedition to Antarctica, 1st, **Scientific report,** Technical Publication No.1, New Delhi, Department of Ocean Development, 1983, 231p., Refs. passim. For individual papers see 38-2469 through 38-2474, or B-29445, B-29455 through B-29468, C-29436, E-29446, E-29447, E-29449, E-29452 through E-29454, F-29433, F-29439, F-29450, I-29434, I-29435, I-29444, J-29438, J-29440 through J-29443, J-29451, K-29437 and K-29448.

This report presents the results of the scientific investigations carried out during the First Indian Expedition to Antarctica. It includes studies on meteorology, geomagnetism, radio-wave propagation, geology, glaciology, chemistry and microbiology of the antarctic ice and the study of freshwater lakes. The oceanographic part includes physical, chemical, biological, geological and geophysical observations on a section of the Indian Ocean.

A-29468
Australia. Department of Science and Technology. Antarctic Division, **ANARE news, no.35,** Kingston, Tasmania, Mar. 1984, p.31-38.

Reports are given: on the new management proposals for reorganizing the Antarctic Division to meet the expanding needs of antarctic construction, transport, and research; new designations and functions are identified and responsibilities explained. On the *Nanok S.* striking a submerged rock shortly after leaving Mawson; no serious damage was sustained, so she went on her way. On the new Director of the Antarctic Division. On the $1.4 million ADP system to be installed over the next two years. Monthly climate summaries at Mawson, Davis, Casey, and Macquarie and a list of meetings of interest scheduled for 1984 and those known in 1985, 1986, and 1988, are included.

A-29486
Holdgate, M.W., **Use and abuse of polar environmental resources,** *Polar record,* Jan. 1984 22(136), p.25-48, 46 refs.

Living resources of polar zones (areas limited by the 10 C isotherm for the warmest month) have in the past been developed exploitatively: examples range from 17th century Arctic whales to musk oxen, caribou, and most recently fin fish stocks from Antarctic waters. Mineral resources as yet remain under-developed, particularly in the Antarctic. This is due to a combination of technological problems imposed by the harsh environment, and marketing problems accentuated by remoteness. Recent scientific and technological advances make further mineral exploitation feasible, though markets do not as yet justify the high costs of development in the Antarctic, where there remain unsolved technical and transportation problems. Future exploitation of living resources is likely to be more conservative than hitherto, especially in the Antarctic where the Treaty System provides potential safeguards. Management plans based on rational decision-making, and incorporating environmental safety measures, are needed to ensure that all further development of renewable natural resources, at either end of the earth, is conducted on a sustainable basis, and that all development proceeds with minimal environmental disturbance. (Auth.)

A-29490
Scientific Committee on Antarctic Research, **Report of the Twelfth Antarctic Treaty Consultative Meeting, Canberra, 1983,** *Polar record,* Jan. 1984 22(136), SCAR bulletin no.76, Jan. 1984, p.101-124.

Brazil and India were accepted as consultative members to the Antarctic Treaty. A list of the participants at the XIIth meeting is given. The agenda was agreed to, and discussions were held on Telecommunications; Man's impact on the Antarctic environment; Environmental impact assessments; Sites of Special Scientific Interest; Tourism and non-governmental expeditions; Activities of countries not party to the Antarctic Treaty; Operation of the Antarctic Treaty System and public availability of the documents of the consultative meetings; Observers; and Exchanges of information under the Antarctic Treaty. The Meeting adopted recommendations which addressed directly or indirectly these issues discussed. Site of Special Scientific Interest No.9, South Bay, Doumer Island, Palmer Archipelago Management Plan is given. The site is described, the reason for designation as an SSSI is explained, and access limitations are set forth. A list and map of stations operating in the Antarctic, winter 1983 are included.

A-29644
Korotkevich, E.S., ed, Dubrovin, L.I., ed, **25 years of Soviet antarctic expeditions** [25 let Sovetskoĭ antarkticheskoĭ ekspeditsii], Leningrad, Gidrometeoizdat, 1983, 176p., In Russian. Refs. passim. For individual papers see 38-2705 through 38-2709 or A-29645, A-29656, B-29655, F-29651, F-29658, G-29657, G-29659, H-29660, I-29647 through I-29649, J-29650, K-29653, K-29654, L-29646 and L-29652.

This is a collection of 16 papers reporting results of Soviet studies dealing with the antarctic ice cover, fluctuations of its glaciation level, the depth of its rift zones, its atmospheric processes, geomagnetism and seismology, the biology of the southern ocean and human adaptation to antarctic conditions.

A-29645
Korotkevich, E.S., Dubrovin, L.I., **A quarter-century of Soviet antarctic expeditions** [Dvadtsatipiatiletie Sovetskikh antarkticheskikh ekspeditsiĭ], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.5-16, In Russian.

A short history of the organization and work of the Soviet antarctic expeditions from 1956 to 1981 is presented. A list of Soviet stations in Antarctica is provided and their function and findings in specific research areas are described.

A-29656
Slevich, S.B., **Shining example of international cooperation in antarctic research** [IArkiĭ primer mezhdunarodnogo sotrudnichestva pri izuchenii Antarktiki], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.118-131, In Russian. 17 refs.

The forms and significance of international scientific cooperation in antarctic research are discussed; the history and articles of the

Antarctic Treaty are briefly reviewed and its role in bringing together the international community of scientists is emphasized.

A-29727

Decrees of the Supreme Soviet Presidium concerning the awards of orders and medals for achievements in antarctic exploration and research [Ukazy Prezidiuma Verkhovnogo Soveta SSSR o nagrazhdenii ordenami i medaliami za zaslugi v issledovanii i osvoenii Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.5-16, In Russian.

Three decrees of the Supreme Soviet Presidium regarding different types of awards for antarctic research are presented and the names and organizations of over 200 award recipients are listed.

A-29809

Akademiia nauk SSSR. Sovetskiĭ komitet po antarkticheskim issledovaniiam, **USSR national report to SCAR. Summary of scientific work carried out in the Antarctic during 1982, in the 1982/83 summer season and provisional plans for 1984** [Otchet v SKAR No. 25. Itogi nauchnoĭ raboty, vypolnennoĭ v Antarktike za 1982 g., letniĭ sezon 1982/1983 g. i plany na 1984 g.], Moscow, 1983, 72p., In English. Bibliography p.61-72.

The SAE carried out research programs in Meteorology, Aurora, Cosmic rays, Ionospheric studies, Geomagnetism, Seismology, Geomagnetic field, Geodesy, Glaciology, Hydrology, and Medicine. In general, for specific projects, the station name, period of observation, schedule, and instrumentation are given. SAE operates seven stations on the continent: Molodezhnaya, Mirny, Vostok, Novolazarevskaya, Bellingshausen, Leningradskaya, and Russkaya. Seasonal field work projects are briefly described and traverses made during the summer are outlined. Planned activities for 1984 are outlined by discipline and by specific topics by station and include seasonal work at temporary bases and aboard research vessels.

A-29810

South African Council for Scientific and Industrial Research. National Committee on Antarctic Research, **South African antarctic research report to SCAR No.25,** Pretoria, Sep. 1983, 30p., Bibliography p.25-27.

In four program areas, i.e., Atmospheric sciences, Biological sciences, Earth sciences, and Oceanographic sciences, the South Africans are pursuing 18 projects. These are listed showing the location of the work site, period, project name, researchers and their affiliations. Details of activities show elements of the research, equipment, observing schedules, and the data gathered. Projected activities from Oct. 1983 to Sep. 1984 are outlined in a similar manner but with less detail in the same four program areas. South Africa's science research programs operate at SANAE Station, Grunehogna Station (summers only), and Gough and Marion Islands.

A-29816

Stallman, S.E., **Gazetteer of the Australian Antarctic Territory,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1983 No.15, 50p.

The history of the Antarctic Names and Polar Medals Committee of Australia is given. Place names principles and criteria are outlined and the procedure for proposing new names is described. The names list contains the decisions of the Committee approved by the Minister for Science and Technology until July 1983. Name and position only are listed. (Auth.)

A-29826

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.18, No.4, Dec. 1983,** Washington, D.C., 1984, 23p., For selected items see: 38-3120 and 38-3121, or A-29827, E-29828 and F-29829.

Three major topics are covered in separate articles: the history of Hallett Station; *Hero* cruise in Chilean waters; and the observation hole in the McMurdo Ice Shelf. Besides these three, reports are given on marine microfossils and glacial history; a conference on the timing and mechanism of the last glaciation, May 1983; seminar on krill biology, May 1983; restructuring of the DPP advisory committee; Antarctic Treaty consultative status for Brazil and India; US/Chile marine research agreement; assessment of antarctic and arctic research by U.S. scientists; NSF awards of funds for antarctic projects from July 1-Sep 30, 1983; and weather summaries for the four U.S. antarctic stations from Aug-Oct 1983.

A-29827

Guthridge, G.G., **Hallett Station, Antarctica, 1956-1973,** *Antarctic journal of the United States,* Dec. 1983 18(4), p.1-8, 18 refs.

The history of Hallett Station from Dec. 1956 through Feb. 19, 1973, when the final evacuation took place, is outlined. Highlights of events over that time span are emphasized. Programs in ice and snow research, geology, terrestrial physics, logistics, and meteorology and atmospheric physics which were undertaken at Hallett are reviewed and the biological program is discussed in some detail.

A-29839

Thomson, R.B., **Antarctic mineral resources: possibilities and problems,** *New Zealand international review,* May/June 1982 7(3), p.7-8.

Practical aspects of the problem of mineral exploitation in Antarctica, and environmental concerns, should exploitation begin, are discussed. Oil is considered as the most likely resource to be first exploited.

A-29840

Logan, H., **Antarctica: why are we there,** *New Zealand international review,* May/June 1982 7(3), p.9-11.

The background to New Zealand's quarter of a century of endeavor in Antarctica is described. Geographic proximity, the claim to the Ross Dependency, exploration and scientific investigation, the Antarctic Treaty, and—more recently—possible exploitation are identified as major factors in New Zealand's antarctic involvement.

A-29869

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.37,** Kingston, Tasmania, May 1984, p.55-66.

This issue tells of the possibility that the Australian Bureau of Mineral Resources, Geology and Geophysics (BMR) may charter a vessel for the next 5 years to conduct marine geoscience projects around the Australian continental shelf and an annual 60 day cruise off the antarctic coast (20 days travel time to and from, 40 days on station). It is also reported that the Federal Government, feeling a money crunch, has decided to reduce funding for antarctic research including stopping a recently approved new antarctic transport system pending the review of revised proposals for the system. Head and shoulder photographs of the wintering parties at Macquarie, Casey, Davis, and Mawson are included in the news from the stations.

A-29873

Royal Society of London. British National Committee on Antarctic Research, **United Kingdom antarctic research 1983 report; April 1982-September 1983: record of activities; October 1983-September 1984: Planned activities,** UK report to SCAR No.25, London, The Royal Society, 1983, 44p., Bibliography p.38-43.

The British occupied and conducted research from Farraday, Signy, Fossil Bluff, Bird Island, Rothera, and Halley Stations in 1982-1983. Tables identify the types of observations made, schedules, and instrumentation used in meteorology, satellite observations, ozone atmospheric sampling, ionospheric and magnetospheric studies, geomagnetism, seismology, geology, physical oceanography, hydrography, topographic surveying, and mapping. A more detailed outline matches specific projects with investigators. A list is given of planned activities for the following year in many of the same disciplines.

A-29897

Santiago de Chile. Instituto Antártico Chileno, **Boletín Antártico Chileno, Vol.3, No.2,** July-Dec. 1983, 47p., In Spanish.

The bulletin briefly reports on a research program carried out by INACH in cooperation with Hubbs Sea World Research Institute, San Diego, Cal., involving penguin-egg development and acclimatization; an article concerning international political interests in Antarctica; and various meetings, such as that of the SCAR group in Pretoria and that of IUGG in Hamburg. Included are four papers dealing with the Antarctic Treaty, chilean activities in the Antarctic, the first INACH scientific expedition, and variations of the name "Antarctica", respectively. For these papers, see A-29899 through A-29901 and M-29898.

A-29899

Barrera V., H., **Antarctic activities and participation of some chilean institutions** [Los asuntos antárticos y la participación de algunas instituciones chilenas], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1983 3(2), p.16-26, In Spanish.

Events relating Chile to Antarctica since 1891—Chile's scientific and geographic interest in the polar regions and actions taken by its government and Congress on the subject—are described. Expeditions and participating individuals and institutions are reviewed.

A-29900

Forch P., A., **First scientific expedition of the Chilean Antarctic Institute** [La primera expedición científica del Instituto Antártico Chileno], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1983 3(2), p.27-31, In Spanish.

Two articles of a 1963 Chilean law by which INACH was created, and activities related to its inauguration, are reviewed, as are details of the 1964 antarctic Chilean 19th expedition regarding its scientific program in its fields of interest: construction, biology, cristallography, ecology, geology, meteorology, ornithology and seismology.

A-29901

Barrera V., H., **Antarctic or Antarctica** [Antártica o Antártida], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1983 3(2), p.32-37, In Spanish.

The two different names that are used in the Spanish language to designate the Antarctic are discussed: Antártica vs. Antártida. The origins and usage of both are examined in the light of official documents, periodicals, dictionaries and legends. It is concluded that both forms are correct: one for its etymological origin, and the other for its general usage.

A-29926

Lorius, C., **Antarctica, desert of ice** [Antarctique, désert de glace], Paris, Hachette réalités, 1981, 155p., Preface by Paul-Emile Victor.

DLC QH84.2.L67

This book is essentially one of photographs and contains perhaps only a half dozen which do not show ice in some form. The beginning text briefly describes the physical scene in size with and without the ice, the ice itself, the climate; geological and climatic relationships; the age of discovery; the heroic era of exploration; mechanical and scientific ages; questions of sovereignty in Antarctica and the Antarctic Treaty; the natural resources of Antarctica. The photographs are of the dominant features of the region: ice, penguins, weather, sea and ships, men and equipment. The text accompanying the photographs substantially augments the main text by identifying events, conditions, places, and activities individually to develop the character of Antarctica and the dominating influence of the ice.

A-29969

Hatherton, T., **Science in Antarctica; intellectual and physical adventure,** *Interdisciplinary science reviews,* Dec. 1982 7(4), p.283-295, 15 refs.

The history of antarctic expeditions and past and ongoing scientific research—on the continent, in the air above it, and in waters surrounding it—are reviewed. The antarctic environment—the dry valleys, the ice sheet, and geological features including meteorites—are discussed. Figures, showing principal stations and areas with rock exposure and illustrating meteorological elements and their dependency on topography and latitude, are presented. It is pointed out that in spite of major iron ore deposit potential in East Antarctica, no economically viable means for its exploitation exist at present. However, high possibilities of economic gain are attributed to the sea, and the shelf surrounding the continent, in terms of ice exploitation and vast quantities of protein and hydrocarbons.

A-29970

Australian marine research in progress, Melbourne, Victorian Institute of Marine Sciences, 1983, 728p.

This is the first updated edition of the Directory of Australian Marine Research in Progress first published in 1982. The main body of this Directory consists of a numbered series of project summaries. Listed are 816 research projects—14 of which concern Antarctica or the southern ocean—by title, period, organization, name of project leader, objective, methodology, status, geographic region, and major descriptors. The summaries are arranged in groups under the following subject classes: techniques and equipment, physical sciences, biomedical sciences, social sciences, fisheries and aquaculture, engineering, resource management, operations, and cartographic materials. Subject, organization, project leader, geographic area, and locality indexes follow the project summaries.

A-30049

Zumberge, J.H., **Potential mineral resource availability and possible environment problems in Antarctica,** New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica. Edited by J.I. Charney, Totowa, NJ, Allanheld, Osmun & Co., 1982, p.115-154, 160 notes and refs.

Mineral resource potential on land, on the contin[illegible] shelf and in deep sea, as well as iceberg utilization, is discussed. The environmental risks associated with mineral exploration and exploitation activities are analyzed. Recommendations for future research are offered.

A-30050

Pontecorvo, G., **Economics of the resources of Antarctica,** New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica. Edited by J.I. Charney, Totowa, NJ, Allanheld, Osmun & Co., 1982, p.155-166, 26 notes and refs.

The evidence on physical presence of nonliving resources in Antarctica is reviewed. Of the living resources, only whales and krill are discussed. This is followed by examination of a set of cost of production estimates leading to the conclusion that under market conditions of rational economic decisions and no subsidization, antarctic resources will not be exploited in the foreseeable future. The relevant political factors are also considered.

A-30060

Schreiber, W., Flechtenmacher, W., Christians, O., **Processing krill *(Euphausia superba* Dana) into food products** [Verarbeitung von Krill *(Euphausia superba* Dana) zu Lebensmitteln], Hamburg, Bundesforschungsanstalt für Fischerei, 1981, 215p., In German with English summary. Refs. p.210-215.

The experience and results obtained until the end of 1979 while processing krill into food, are compiled and evaluated. Force meat from cooked (steamed) krill may be the intermediate key to the production of various food stuffs. Special emphasis has been put on developing methods for preparing boiled or cured sausages from this force meat and other ingredients as minced fish and lard. This preference given to the force meat and its processing into sausages is based both upon economic considerations (the yield of force meat is 5 times the yields of tail meat from peeling of raw krill), and upon estimation of the food habits of the German consumer. (Auth.)

A-30080

U.S. National Science Foundation. Division of Polar Programs, **Facts about the United States Antarctic Research Program,** Washington, D.C., July 1984, 13p., Refs. p.8-9.

This pamphlet provides a digest of the United States Antarctic Research Program operation: a description of year-round U.S. stations and summer camps, transportation facilities, research objectives, Federal responsibilities, the international cooperation and U.S. policy for Antarctica, and a brief history of U.S. involvement. A final section provides sources for further information on Antarctica. A complete text of the Antarctic Treaty is appended.

A-30084

Pinto Coelho, A., **At the confines of three oceans—Antarctica** [Nos confins dos três mares—a Antártida], Rio de Janeiro, Biblioteca do Exército, 1983, 358p., In Portuguese. Numerous refs. passim.

This revised edition of the book originally published in 1982 (See 12A-26141) is divided into the following chapters, each of which has its own bibliography for further reference: conquest of Antarctica; era of exploration; the continent itself; the surrounding ocean; flora and fauna; and Brazil's activity in the area. A number of helpful appendices, enriched with new data on antarctic scientific activities, politics and treaty arrangements, safety, logistics, and other topics of current concern are attached.

A-30087

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, No.38,** Kingston, Tasmania, June 1984, p.67-78.

The lead story involves reassessment of Australia's role in Antarctica by the Chairman of the Antarctic Research Policy Advisory Committee. The Chairman sees little significant Australian scientific research being done in Antarctica; he believes more funds should be put into the program to gain a larger result or Australia should pull out altogether. Photos show and text describes a successful air drop at Macquarie. Thirteen recent antarctic papers by Australians are cited and abstracted. Brief news items are included about other nations in Antarctica; giving happenings on antarctic related topics; telling of people engaged in antarctic related activities. Climate summaries for May 1984 at the Australian antarctic stations are given and coming events for as far ahead as 1988 are listed. All continues well with wintering parties: a successful air drop at Macquarie; ANZ superwalk at Davis; standing wave clouds during a blizzard at Casey; a 3-day complete radio blackout at Mawson.

A-30088

Hushen, W.T., **Focus: Polar Research Board,** *National Academy of Sciences. Polar Research Board. News report,* May 1984 34(5), p.13-15, 29-30.

Interest in developments in polar regions has been emphasized in Presidential memoranda. Response by the polar Research Board has been a series of studies on Antarctica and the Arctic regions. Five of the studies are published, four are in progress and two are in the planning stage. These include reports on marine ecosystem research, upper atmosphere and near-space, polar biomedical research, snow and ice research, permafrost research, climate, geosciences, and oceanography.

A-30089

Kaiser, K., **Antarctica** [Antarktika], *Horizont,* 1984 17(4), p.12-13, In German.

A general overview is given of Antarctica and its development into a region of international interest. Discussed are: the physical territory; the climate; the Antarctic Treaty, its operation and organization; roles of SCAR and the various national antarctic committees; territorial claims; scientific research programs, the countries, stations, and personnel; and the natural resources of Antarctica both mineral and living.

A-30095

U.S. National Science Foundation, **Thirty-third annual report for fiscal year 1983,** Washington, D.C., 1983, 126p.

Scientific and engineering research sponsored by the National Science Foundation during 1983 is reviewed. Highlights of studies in many disciplines carried out in the Antarctic deal with the following subjects: antarctic meteorites of lunar and martian origin, marine fossils found atop the Transantarctic Mountains, and the mapping of antarctic ice surface elevations by satellite. The four year-round stations where the United States conducted its antarctic research are described, as are some of the activities of the Antarctic Treaty nations. Progress on the development of a mineral resources regime is reported.

A-30107

Twenty five years of research in the Antarctic, *Soviet meteorology and hydrology.* 1981 No.1, p.1-6, Translated from Meteorologiia i gidrologiia.

Some of the Soviet research projects carried out in the Antarctic during the last quarter century are reviewed. They cover, basically, atmospheric observations, weather forecasting procedures, and the influence of the antarctic continent on global climate. Studies of the antarctic ocean in programs implemented on both the national and international levels are also reviewed, as are investigations of the antarctic ice cover and geological surveys. The main results of the latter are described.

A-30127

Yoshida, Y., **Activities of the wintering party of the 22nd Japanese Antarctic Research Expedition in 1981-1982,** *Antarctic record,* March 1984 No.81, p.45-71, In Japanese with English summary.

Thirty-four men wintering at Showa and Mizuho Stations from February 1, 1981 to January 31, 1982, carried out observations in many scientific disciplines. In the POLEX-South project, micrometeorological and aerological observations were carried out in the inland plateau during the oversnow traverse and at Mizuho Station. Glaciological studies, as well as crustal structure studies, consisting of aeromagnetic survey, gravity measurement, heat flow measurement, and ground-tilt measurement are reported. Submarine geology, geomorphology, meteorite search and glacial geomorphological surveys were also carried out. Aerial photography covered 80% of the Sor-Rondane Mountains region. At Showa Station, besides the routine observations of aurora, geomagnetism, ionosphere, meteorology, seismology, and ocean tide, studies of upper atmosphere physics including geophysical data reception from scientific satellites, environmental pollution, and medical science were conducted. In particular, the data acquisition system in upper atmosphere physics was greatly improved, introducing a computer processing system and a data telemetering system from a newly-built automatic station. (Auth.)

A-30128

Hoshiai, T., **Activities of the wintering party of the 23rd Japanese Antarctic Research Expedition in 1982-1983,** *Antarctic record,* March 1984 No.81, p.72-94, In Japanese with English summary.

The wintering party of the Japanese Antarctic Research Expedition (1982-1983) consisting of 34 members carried out multidisciplinary observations in the vicinity of Showa and Mizuho Stations between February 1982 and January 1983. The routine and fundamental observations comprising studies of aurora, geomagnetism, ionosphere, meteorology, oceanography, seismology and geodesy were performed as in the preceding years. Research on the physical and chemical properties of the middle atmosphere and ecological investigations of marine coastal ecosystems were also conducted. To clarify dynamics of the ice sheet, glaciological studies were carried out in the Mizuho Plateau by the oversnow traverses. (Auth.)

A-30188

Lewis Smith, R.I., **Beauchêne Island: a historical account,** *Polar record,* May 1984 22(137), p.159-168, 29 refs.

Southernmost of the Falkland Islands, Beauchêne Island is a wildlife reserve with large colonies of Black-browed albatrosses and Rockhopper penguins. Discovered and named in 1701 by the French explorer Jacques Gouin de Beauchesne, it was noted by many early navigators and visited frequently by fur sealers in the 19th century. This article draws attention to early reports and outlines what is known of the island's history. (Auth.)

A-30191

New Zealand Antarctic Society, **Antarctic, Vol.10, No.5,** Christchurch, March 1984, p.158-196.

The principal features of the New Zealand antarctic research program for 1984-1985 are outlined, including CIROS, the largest, a geological drilling project in McMurdo Sound, and a geophysical and geological effort of New Zealand, United States and West Germany, which will take place in North Victoria Land. An account of past activities includes construction work on the Scott Base, the settling in of the winter team, the Ohio Range and the Olympus Range geological expeditions with glacial beds and soil studies, and penguin counts. The news items cover the possibility of re-establishing Hallett Station as a small scientific base; the swelling of the Onyx river; the establishing of the Indian station Dakshin Gangotri; a decline in numbers of seals killed to feed huskies; a report of the 90 American projects carried out on the continent and in southern waters; the opening of the new Halley Station; and biological and glaciological investigations by West Germany.

A-30199

Earth scientists visit Antarctic, *Scientiae,* Jan.-March 1984 25(1), p.36.

It is reported that a team of sixteen earth scientists went to Antarctica at the end of 1983 on board the *SA Agulhas* to carry out land surveying and geological research. The scientists traced the thermal and tectonic history of metamorphic rocks in the Penck Trough for comparison with metamorphic rocks found in Natal and Namaqualand. The objective of the study was to better understand how Antarctica, South America, Australia, Africa and peninsular India originally fitted together and what was the sequence of events that led to their separation. The land surveying team collected data from which accurate maps of the area are to be prepared.

A-30203

American Geophysical Union, **Spring meeting 1983, abstracts,** *American Geophysical Union. Transactions,* Nov. 8, 1983 64(45), p.627-926.

Seventeen of the papers presented at the AGU spring meeting relate to the Antarctic and the southern ocean. Pertinent abstracts are in the following categories: glacial geology—2 (p.660); political considerations—2 (p.660); glacier ocean interactions—4 (p.695-696); ocean sciences—3 (p.731); ionosphere—1 (p.777); mesosphere-thermosphere—1 (p.782); cosmic rays—1 (p.792); VLF waves—1 (p.804); charged particles—1 (p.816); and mantle petrology—1 (p.903).

A-30212

U.S. National Science Foundation. Division of Polar Programs, **United States Antarctic Research Program personnel manual,** Washington, D.C., 1984, 86p.

The manual, which is revised annually, provides detailed information on personal responsibilities, conduct, and logistics for personnel working in Antarctica under the auspices of USARP. It covers a wide range of topics dealing with individual activities and requirements prior to leaving for Antarctica, travelling through South America and/or New Zealand, and travel to and in Antarctica. Medical requirements are given, personal affairs suggestions are made in a number of areas, and policies on transporting scientific cargo and collecting and transporting biological specimens are stated. Appendices provide texts of important documents such as the Antarctic Treaty, the various conservation conventions, historic monuments, and White House Memorandum No. 6646, among others.

A-30214

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, no.36,** Kingston, Tasmania, Apr. 1984, p.39-54.

Reports are given on: the 4th Special Antarctic Treaty Consultative Meeting on the proposed minerals regime; ice runway studies near Casey; a gyre in Prydz Bay; seal calls and diets; progress of rebuilding at Casey; recent Australian antarctic publications; and activities of other nations in Antarctica. Weather summaries are given for March 1984 at Mawson, Davis, Casey, and Macquarie Stations. Casey was engrossed with getting the winter traverse off to a good start and Operation Scrub an Egg; Mawson folks were dealing with helicopter trips with South African visitors, and pup training with the huskies; at Macquarie they passed the time scraping, painting, and avoiding gamey elephant seals; cleanliness being next to Godliness at Davis, the drill now is 3 showers/wk/expeditioner.

A-30215

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.19, No.1,** Washington, D.C., Mar 1984, 23p.

Included in this issue are reports of: the 12th Antarctic Treaty Consultative Meeting, Sep 1983 in Camberra, along with the text of eight approved recommendations; geological studies in the southern Andes by scientists from *R/V Hero* during the austral winters of 1982 and 1983; ice coring at the South Pole and resulting estimates of ice temperature and chronology; the history of the operation of the Eklund Biological Center at McMurdo; availability of ice cores at SUNY Buffalo; a NASA publication on sea ice data; a review of potential petroleum and mineral resources by USGS geologists; and NSF antarctic funding awards made from Oct 31 through Dec 31, 1983. A summary of weather conditions for Nov and Dec 1983 and Jan 1984 at McMurdo, Siple, Palmer, and South Pole stations is also given.

A-30217

National Research Council. Polar Research Board, **Report on United States antarctic research activities, February 1983-October 1984; United States antarctic research activities planned for October 1984-September 1985,** *National Academy of Sciences-National Research Council. Report to SCAR,* June 1984 No.26, 101p., Bibliography p.68-91.

The United States research program is reviewed as to major discipline and specific programs in atmospheric, biological and medical earth, sciences: what is being investigated, who are the investigators, stations where research is conducted, and the instruments used. Research vessel operations and information activities are also outlined. Plans for the 1984-1985 season are summarized. A bibliography of U.S.-published contributions to antarctic research is included.

A-30219

Akademie der Wissenschaften der DDR. Wissenschaftliches Komitee für Antarktisforschung, **Antarctic research activities of the German Democratic Republic; Report to SCAR No.5; Record of activities February 1983-October 1984; Planned activities October 1984-October 1985,** Berlin, June 1984, 14p., 38 refs.

The Committee lays out its current and proposed programs carried out within the Soviet Antarctic Expedition working at Novolazarevskaya, Bellingshausen, Druzhnaya, Vostok, Mirnyy, and Molodezhnaya Stations and in the Schirmacher Ponds and Wohlthat Mountains regions. Programs included are in geomagnetism, atmospheric physics, meteorological satellites, geology, isotopes in nature, fresh water chemistry, biology and medicine. Specific projects are listed with instrumentation, principal investigators, and sponsoring agencies.

A-30272

Santiago de Chile. Instituto Antártico Chileno. Comité Nacional de Investigaciones Antárticas, **National report to SCAR No.25, 1983; Activities from 1982 to 1983; Programs for 1983-1984** [Informe de la actividades antárticas de Chile al SCAR No. 25 - 1983; Actividades Abril 1982-Octubre 1983; Actividades programadas Octubre 1983-Octubre 1984], Santiago de Chile, Instituto Antártico Chileno, 1983, 44p., In Spanish.

The research conducted at Chile's Prat, O'Higgins, Marsh, and Videla stations, on its two ships *Capitán Luís Alcazár* and *Itzumi,* and at its temporary base camps is summarized. The report is organized by discipline, in terms of programs accomplished and instruments used. Proposed programs for 1984 are listed in detail. A bibliography of Chilean publications for the report period is also included.

A-30273

Buenos Aires. Instituto Antártico Argentino, **National report to SCAR No.24, 1982; Antarctic scientific activities for 1981-1982; Planned program for 1982-1983,** Buenos Aires, 1982, 35p. + appends.

The research conducted at Argentina's eight permanent stations, on its two ships, two airplanes, four helicopters, and at its three temporary base camps is summarized. The report is organized by discipline, in terms of programs accomplished and instruments used. A bibliography of Argentine contributions for the report period is also included, as are three appendices listing the Argentine bases and stations in Antarctica with climatology and radio communications data. Proposed programs for the 1982-83 season and the winter of 1983 are outlined.

A-30326

Sahrhage, D., **Annual meeting of the Commission for the Conservation of Antarctic Marine Living Resources** [Jahrestagung der Kommission für die Erhaltung der lebenden Meeresschätze der Antarktis], *Hamburg. Bundesforschungsanstalt für Fischerei. Informationen für die Fischwirtschaft,* 1983 30(4), p.199-200, In German.

A brief account is given of the proceedings at the Hobart, Tasmania meeting, Aug. 29-Sep. 9, 1983. Most of the discussions centered on Articles IX, XV, and XX dealing with fishing and catch sizes and improving the formulas for determining these aspects in order to manage better the antarctic marine resources.

A-30329

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **New Zealand antarctic research programme 1984-85,** Aug. 1984, 21p.

Following remarks on antarctic physical characteristics, logistical responsibilities, New Zealand bases, emergency and historical huts, and available ground transport, the booklet outlines the scope and objectives of individual programs planned for 1984-1985. Participating universities and government agencies are listed and specific projects show the responsible university department or government agency, program title, a précis of program work and goals and the time frame for accomplishing the tasks.

A-30331

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic operations manual,** Christchurch, 1984, 71p.

The manual is designed to assist researchers and support personnel during their stays in Antarctica and to inform them of their individual roles and responsibilities in antarctic research activities. Rules and procedures are explained for the safe and successful accomplishment of the scientific programs. Among others, topics discussed include: administration and personal instructions; fire and electrical hazards and historical monuments; and shipping and cargo movements to and from Antarctica. A summary of Antarctic Treaty provisions is given; and samples of collection permits and import declarations for biological specimens are shown.

A-30341

Linkowski, T.B., ***Electrona carlsbergi* (Tåning, 1932), the principal component of a deep scattering layer in the Pacific sector of the antarctic ocean,** *Polish polar research,* 1983 4(1-4), p.71-78, With Russian and Polish summaries. 19 refs.

During a cruise of the fishing vessel *Sagitta* around Antarctica, the occurrence of deep scattering layers was noted in a small area of the Pacific sector of the Antarctic waters. The layers were found at depths of 50-150 m. Their main component was *E. carlsbergi* (family

Myctophidae), whose maximum density was within the range of 0.-0219-0.0437 fish per cu m. (Auth.)

A-30369

Germany. Federal Republic. National Committee on Antarctic Research, **National antarctic research report to SCAR No.6. 1. Record of activities (past and ongoing) April 1983-October 1984. 2. Planned activities: October 1984-October 1985,** Bremerhaven, 1984, 38p., Refs. p.27-37.

The report outlines past and ongoing research projects, specifying the location and the period of their occurrence. The research is grouped under marine biology, geology, glaciology and geophysics, marine geology, geodesy and cartography, oceanography, extraterrestrial physics, cosmochemistry, air chemistry, and meteorology. The planned activities, from Oct. 1984 to Oct. 1985, cover the above fields plus terrestrial biology.

A-30370

Santiago de Chile. Instituto Antártico Chileno. Comité Nacional de Investigaciones Antárticas, **National report to SCAR No.26 - 1984; Activities from 1983 to 1984; Programs for 1984-1985** [Informe de las actividades antárticas de Chile al SCAR No.26 - 1984; Actividades Abril 1983-Octubre 1984; Actividades ₍programadas₎ Octubre 1984-Octubre 1985₎, Santiago de Chile, Instituto Antártico Chileno, 1984, 45p., In Spanish.

This report summarizes the research conducted at Chile's Prat, O'Higgins, Marsh, Videla, and Adelaida Stations, on its two ships *Piloto Pardo* and *Capitán Luis Alcazár,* and its temporary base camps. The report is organized by discipline, in terms of programs accomplished. Proposed programs for 1984-1985 are outlined. A bibliography of Chilean publications for the report period is also included.

A-30441

Gjelsvik, T., Guyer, R.E., **Scientific research and cooperation in Antarctica,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.41-51, Comments by R.E. Guyer, p.52-56.

The roles of international scientific organizations and programs are examined: ICSU, SCAR, WMO, IAGP, BIOMASS. Significant achievements made over the years in meteorology, mapping, geophysics, geology, glaciology, oceanography, and terrestrial and marine biology are noted and the evidence of international scientific cooperation in these programs is stressed. The cooperative spirit between SCAR and the Antarctic Treaty system is discussed with particular regard to conservation of living marine resources which led to the CCAMLR and the lengthy studies in progress for the establishment of an antarctic minerals regime. In his comments Guyer calls scientific cooperation one of the great achievements of the Antarctic Treaty System. He describes some of the rocky roads the concept travelled before being accepted and urges a continuation of the antarctic spirit which played such a great part in fostering scientific cooperation.

A-30445

Hempel, G., **Antarctic research in the Federal Republic of Germany,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.133-142.

The German experience in Antarctica is briefly reviewed and the West German resurgence of interest in antarctic research from 1975 is outlined. Scientific research interests are identified and major programs in the various disciplines are stated. Ice budget measurements in the Filchner Ice Shelf region; water mass investigations and water chemistry; phytoplankton ecology, microbiology of the food chain, and life in the winter pack ice; and construction on ice are a few specific projects. Comparison is made between the pre-1975 research effort which was mainly done by universities privately supported and with a minimum of coordination and the current programs which are largely government supported and have a central coordinating agency. Antarctic stations are identified as to location, available facilities (including the R/V *Polarstern* and two aircraft), capabilities, and personnel. Research goals and opportunities for international research efforts are emphasized.

A-30476

Parfit, M., **Last continent, Part 1,** *Smithsonian,* Oct. 1984 15(7), p.48-60.

The reporter describes his impressions of Antarctica following a four-month visit which took him from McMurdo to Mt. Siple, to Lake Vida and back to McMurdo. During this time he met and talked to scientists, shared time in the field with them, discovered what they were doing, their philosophies, and why scientists came there, and their views on the future of Antarctica.

A-30512

New Zealand Antarctic Society, **Antarctic, Vol.10, No.6,** Christchurch, 1984, p.198-232.

Brief accounts are given of on-going national polar activities: New Zealand offers China its choice of seven sites in the Ross Sea area for establishing a permanent research station; the United States, in conjunction with three other nations, will engage in a geological and geophysical program and tectonics investigations; Australia has future marine geoscience research plans; Norway is working on ornithological and seabed sediment studies; Russkaya reports a wind speed of more than 110K; the BAS is working its geological way to the South Pole; Argentine lost its Almirante Brown Station to fire, fortunately with only one person slightly burned; Peru is making expedition plans for an antarctic research program. Additionally, reports are made of awards of polar medals; Finland's accession to the Antarctic Treaty; a private Norwegian-British expedition is underway following Amundsen's route to the Pole; a Minke whale survey in southern waters; the vessel *Kista Dan* sold to Greece; the acquisition of the *Lindblad Explorer* by the travel firm Society Expeditions of Seattle.

A-30529

Holm-Hansen, O., Chapman, A.S., **Antarctic circumnavigation cruise, 1983,** *Antarctic journal of the United States,* 1983 18(5), p.162-163, 1 refs.

The primary purpose of the antarctic circumnavigation cruise was to enable a four-person team of U.S. antarctic observers to visit foreign scientific stations in East Antarctica, a part of the continent only occasionally visited by U.S. ships and personnel. There were five scientific programs on board the vessel: distribution of marine mammals, bird observations, chemical oceanography, microbial studies, and marine mammal detection using a towed acoustic array. In addition, air samples were collected daily for analysis of CO2 by NOAA.

Two other research vessels were encountered by the *Polar Star* during its circumnavigation cruise: the *Polar Circle* (Norwegian ownership with Canadian registry) which has been leased by India for antarctic studies, and FS *Polarstern*, the new icebreaker-research vessel from the Federal Republic of Germany.

A-30543

Anderson, P.J., **Antarctica,** Encyclopedia Britannica 1981 Book of the year, Chicago, Encyclopedia Britannica, 1981, p.180-181.

This article briefly summarizes the 1979-1980 field season in Antarctica, listing the nations taking part in the research and mentioning the highlights of the programs of each country. International research programs are also reported.

A-30544

Anderson, P.J., **Antarctica,** Encyclopedia Britannica 1982 Book of the year, Chicago, Encyclopedia Britannica, 1982, p.178-180.

This article briefly summarizes the 1980-1981 field season in Antarctica, listing the nations taking part in the research and mentioning the highlights of the programs of each country. International research programs are also reported. Two maps of Antarctica illustrate the geological findings indicating that Antarctica's land mass is smaller, and the ice shelf areas larger, than previously believed.

A-30545

Anderson, P.J., **Antarctica,** Encyclopedia Britannica 1983 Book of the year, Chicago, Encyclopedia Britannica, 1983, p.172-175.

This article briefly summarizes the 1981-1982 field season in Antarctica, listing the nations taking part in the research and mentioning the highlights of the programs of each country. International research programs are also reported. A map showing the boundary of the protection zone for marine organisms, established on April 7, 1982, by the Convention on the Conservation of Antarctic Marine Living Resources, is included.

A-30546

Sömme, L., **Summer in the Antarctic among penguins, seals and whaling relics** [Sommer i Antarktis blant pingviner, sel og hvalfangstminner], Oslo, Norway, Universitetsforlaget, 1983, 128p., In Norwegian.

In photographs and text the experiences of four journeys to Antarctica are described. The trips took the author to Vestfjella in Queen Maud Land, the Falkland Islands, Bouvet, the South Orkneys, and South Georgia. At all of these places plants, animals, and local environments, especially the old whaling stations, were explored and photographed.

A-30560

U.S. National Science Foundation, **Antarctic journal of the United States, Vol. 19, No.2,** Washington, D.C., June 1984, 24p., For selected papers see A-30563, E-30561, E-30564, G-30562 and G-30565.

In Addition to the articles abstracted separately, reports are given on the U.S. response to the U.N. request for information on its antarctic research activities; comparison of antarctic and US Midwest wind chill; results of first investigations on Mt Siple; R/V *Hero* assists Argentine personnel when fire destroyed Almirante Brown Station; the last antarctic voyage of the USNS *Southern Cross* and her Master, Captain Bjorn Waring; the death of Hugh Odishaw, former director of the US IGY Committee; Antarctic Conservation Act permit applications; NSF antarctic funding awards from 1 Jan through 31 Mar, 1984; and weather at the US Stations for Feb, Mar, and Apr 1984.

A-30572

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, Jul/Aug 1984,** Kingston, 1984, p.79-98.

In this issue reports are made on: the Australian Antarctic Research Policy Advisory Committee warning that Australia needs to expand its research programs if it is to influence decisions concerning antarctic resources; the chartering of M/V *Icebird* for SIBEX III; both Australian and New Zealand Labour Parties announced their positions on antarctic research; the burning of Almirante Brown Station; the upward revision of krill life spans; confirmation of a large variation of the antarctic ice sheet; the Vestfold Hills Symposium on biological research in ice-free regions, the decline in elephant seal populations and low levels of pesticides in antarctic sea birds.

A-30594

Splettstoesser, J.F., **Proposed antarctic expedition (A.D. 1902),** *Grants magazine,* Sep. 1982 5(3), p.154-155, 1 ref.

An eighty-year-old proposal provides the opportunity for a look at the evolution of grantsmanship and the availability of research funds at the turn of the century. Comparison of the proposed expedition costs is made with actual costs of some of today's similar operations; a cost-sharing provision in the proposal is commented on; and a few "might-have-beens" had the proposal been accepted, are suggested.

A-30599

McElroy, J.K., **Antarctic fisheries: history and prospects,** *Marine policy,* July 1984 8(3), p.239-258, Numerous refs.

The historical development of the fisheries for seals, whales, finfish and krill in the Antarctic is outlined. Particular emphasis is given to the development of the antarctic krill fishery, the continued exponential expansion of which is causing increasing concern among fishery biologists and economists. The main prospects for fisheries development in the Antarctic lie with antarctic krill and the stocks of baleen whales that are now recovering satisfactorily. Because of their ecological coupling, the existing pattern of exploitation implies that trade-offs between krill and whales have already begun and may soon significantly affect the future economic benefits that could be derived from this ecosystem. Thus important management decisions that will affect the future size and shape of these two fisheries must be faced now. (Auth.)

A-30601

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno, Vol.4, No.1,** Jan.-June 1984, 72p., In Spanish.

This bulletin describes current research efforts by Chile, reports on meetings and conferences, and includes short articles. For selected papers, see A-30603, A-30605, A-30608, A-30609, B-30604, B-30606, B-30607 and E-30602.

A-30603

Stehberg L., R., Cabeza, A., **First antarctic historic archeology excavations** [Primera excavación de arqueología histórica antártica], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.15-17, In Spanish. 6 refs.

Activities on King George Island, resulting in findings of remnants of former expeditions engaged in seal hunting, are reported. Historical antecedents are reviewed and some statistics regarding the numbers of boats participating in the hunt, and seals exterminated in the South Shetland Islands area in the 1800s, are given.

A-30605

Romero J., P., **Twentieth anniversary of the Chilean Antarctic Institute** [20 aniversario del Instituto Antártico Chileno], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.28-32, In Spanish.

INACH's contribution, in the 20 years since its foundation, to Earth and biological sciences studies, and its participation in international research projects such as FIBEX and SIBEX, are reviewed.

A-30608

Nilo F., L., **Protection of antarctic environment and private expeditions** [Protección del ambiente antártico y expediciones no gubernamentales], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.45-55, In Spanish. 7 refs.

Articles and recommendations of the Antarctic Treaty are reviewed, with emphasis on those concerning environmental protection and effects of the development of antarctic tourism. Tables showing chronological lists of year, month, organization, boat, and number of passengers visiting Antarctica between 1958 and 1980, as well as those showing numbers of tourist flights between 1956 and 1984, are presented.

A-30609

Eberhard, P., **Scientific progress in Antarctica** [Evolución científica en la Antártica], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.56-58, In Spanish.

A brief analysis of the development of science in general, and the history of antarctic research in particular, is offered.

A-30623

Nishimura, J., Kodama, M., Tsuruda, K., Fukunishi, H., **Polar patrol balloon: I. Balloon system,** *Antarctic record,* Aug. 1984 No.82, p.71-78, In Japanese with English summary. 4 refs.

Because of the importance of balloon observations in polar regions, a project, Polar Patrol Balloon, is proposed in which a balloon will be able to float and observe around Antarctica for a month. In this project, the balloons are to be launched from some bases in Antarctica where there is no sunrise in the winter and no sunset in the summer, and a zero pressure balloon can maintain its altitude for one month by dropping a small amount of ballast. A study of meteorological feasibility had been made for this project, and it was found that a period for the balloon to fly around the pole is about one week in the winter and a few weeks in the summer at an altitude of 30 km. The deviation of the trajectory from a circle is smaller in the summer season. A feasibility study was also made for power supply, on board memory storing observed data, and auto-ballasting system to perform the flight of about one month. The balloon will be tracked by ARGOS systems during the flights. Some merits of possible international collaboration for this project are also discussed. (Auth.)

A-30624

Kodama, M., Fukunishi, H., **Polar patrol balloon: II. Observation plan,** *Antarctic record,* Aug. 1984 No.82, p.79-85, In Japanese with English summary. 8 refs.

As described in Part I, from a feasibility study of the Polar Patrol Balloon (PPB) which circles along a selected geographic latitude over Antarctica, it has been concluded that the PPB will be developed in the near future. The application of the PPB system is discussed in this paper. The PPB will provide data in upper atmosphere physics, meteorology, glaciology, and logistics to solve problems which have heretofore gone unresolved using spacecraft and rocket sounding techniques. (Auth. mod.)

A-30629

Avsiuk, G.A., ed, **Antarctic Committee reports, No.17. Main results of twenty years' research in the Antarctic,** New Delhi, Amerind Publishing Co., 1984, 348p., TT 79-52012, For Russian original see 10A-21685 or 33-3619. For individual papers see A-30630, A-30631, A-30649, B-30650, C-30646, E-30641 through E-30645, E-30648, F-30639, F-30640, H-30651, H-30652, I-30635, J-30637, K-30632 through K-30634, K-30636, K-30638, K-30653 and L-30647, or 39-553 through 39-555.

This volume comprises papers read at the 2nd All-Union Conference on Antarctic Research, commemorating the 20th year of Soviet activity and international cooperation in the Antarctic. The papers review the most significant findings in the last 20 years, their practical application in exploiting the polar areas, and the direction research should take in the future.

A-30630

Korotkevich, E.S., Dubrovin, L.I., **Two decades of Soviet research in the Antarctic,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.1-18, TT 79-52012, For Russian original see 10A-21686.

This is a short history of the organization and work of the Soviet Antarctic Expedition from 1955 to 1976. Research carried out at stations and on traverses, and the most significant developments, are reviewed.

A-30631

Tolstikov, E.I., **Antarctica is a continent of peace,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.19-27, TT 79-52012, For Russian original see 10A-21687.

International scientific cooperation in the Antarctic over the past 20 years is described. This collaboration has been highly productive and clearly demonstrates the feasibility of various nations' working together to carry out common scientific tasks. A foremost example of international goodwill is the pooling of resources by Treaty signatories in scientific research. (Auth. mod.)

A-30649

Dubrovin, L.I., Preobrazhenskaia, M.A., **Russian names in the toponymy of the Antarctic,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.275-286, TT 79-52012, For Russian original see 10A-21705. 22 refs.

This article describes the toponymy of Antarctica, where natural conditions and land forms differ greatly from those in other parts of the world. A review of the soviet Antarctic Expedition—their geographical and cartographic work—and the place names assigned by SAE is offered. Names given in honor of the first Russian Antarctic Expedition and by other nations in honor of Russian explorers are also discussed. (Auth. mod.)

A-30655

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Bibliography of international dry valley publications, 1907-1977. Supplement No. 3. 1981-1982,** Christchurch, 1983, 29p.
DLC Z6005.P7M4

This supplement is arranged by sections according to primary scientific subject content. It supplements 10A-20588, 11A-22573, and 13A-27109.

A-30665

IAmpol'skaia, N., **Vello Park and his peaks,** *Soviet life,* Sept. 1984 No.9(336), p.10-15.

A fire, which destroyed the power plant at Vostok Station in April 1982, is reported. The article describes how the members of the expedition survived in the -70 deg C temperature and how they were able to continue with their research programs. Photographs of men and equipment are included.

A-30738

Slevich, S.B., **Economic geography of the southern ocean,** *Polar geography and geology,* Jan./Mar. 1984 Vol.8, p.54-62, For Russian original see 13A-28027. 23 refs.

The boundaries of the southern ocean are delimited and divided into three distinct latitudinal zones, namely the temperate, subantarctic and antarctic zones. Each zone is then examined for its economic significance and potential in terms of shipping routes, mineral resources and fisheries. Probably the most significant economic potential of the southern ocean lies in its vast resources of krill, widely considered to be a future major world source of protein, and in the reserves of hydrocarbons known (or suspected) to lie beneath the continental shelves. (Auth.)

A-30751

Jones, A.G.E., **Antarctic observed; who discovered the antarctic continent,** Whitby, Yorkshire, England, Caedmon of Whitby, 1982, 118p., Numerous refs.

DLC G860.J66 1982

This endeavor to resolve the question of who discovered Antarctica relies to a large extent on original sources—log books, narrative reports, and manuscript charts—of the ship captains involved. Many of these, of course, no longer exist but those which remain are used extensively. Following a background review of the early voyages of those whose business carried them near the continent, the author focuses on Cook, Smith, Bransfield, Bellingshausen, and Palmer. Log books and ships' courses are reproduced, weather conditions are noted, and comments are made on the state of the navigational arts and instruments available during the discovery period. Brief biographies of each of these master mariners are given and their achievements and efforts at sailing through the ice to the continent are assessed.

A-30752

Shackleton, E.H., Ralling, C., comp, **Shackleton, his antarctic writings selected and introduced by Christopher Ralling,** London, British Broadcasting Corp., 1983, 263p., 2 refs.

DLC G875.S5A37 1983

This book is neither a biography nor an autobiography. What remains of Shackleton's writing are letters, diaries, newspaper articles, some poetry and of course the published volumes which tell the story of his two famous expeditions: *Heart of the Antarctic,* and *South.* This book is a selection from all these sources, which have never previously been collected together in a single volume. The linking passages have been added to fill in the gaps in the overall pattern of his life, and to throw light on some events in the story where he does himself less than justice, or avoids an issue altogether, rather than ruffle the feathers of his contemporaries. *Heart of the Antarctic* is the story of Shackleton's 1908 attempt to reach the South Pole from New Zealand via McMurdo with *Nimrod* taking the expedition to McMurdo and back. *South* is the account of the Weddell Sea Expedition in *Endurance* which was beset, crushed, and finally sunk by the ice 450 miles south of Elephant Island. (Auth. mod.)

A-30754

German Democratic Republic. Nationalkomitee für Geodäsie und Geophysik, **Symposium on antarctic research by the GDR** [Symposium zur Antarktisforschung der DDR, Garwitz 1982], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, 111p., In German with English and Russian summaries. For individual papers see A-30755, A-30756, B-30766, C-30760, C-30764, E-30765, F-30761 through F-30763, G-30767, I-30768, K-30758, K-30759 and L-30757.

The fourteen papers presented at the symposium address the following topics: review of 25 years of cooperation in antarctic research; activities of GDR scientists participating in the SAE; magnetic measurements in the Schirmacher Oasis region; upper atmosphere particle effects; diurnal asymmetry of electron precipitation; satellite geodesy; trends in glaciological research; results of geodesic/glaciological research on Hays Glacier; C-14 dating of plants and penguin guano; hydrographic chart of the Schirmacher Oasis; south polar skua at Schirmacher Oasis; thermo-physiological aspects of polar clothing; antarctic dust measurements.

A-30755

Paschel, H., **25 years of cooperation between geophysicists of socialist countries** [25 Jahre Zusammenarbeit der Geophysiker sozialistischer Länder], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.3-12, In German.

A brief history of German participation in international geophysical research activities is given. This historical review traces the participation from the last quarter of the 19th century and points out benchmarks leading to the cooperation among socialist countries now existing since the IGY in 1957-1958. Significant events, meetings, and examples of the cooperative spirit are cited for the interval since the IGY. International aspects of antarctic research are emphasized in the formation and functioning of various international organizations and the development of improved measuring instruments and methods. Significant publications issued and programs initiated during the 25 years are also cited.

A-30756

Stange, L., **Polar research activities of the GDR** [Aktivitäten der DDR auf dem Gebiet der Polarforschung], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.13-17, In German with English and Russian summaries.

A general overview is given of research and exploration in polar regions. Scientists of the GDR have participated jointly in 17 Soviet Antarctic Expeditions and these, along with logistical preparations for two independent Spitzbergen expeditions have opened the way for significant achievements in polar research. An outline of these results is given.

A-30787

Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos, **Boletim, No.3,** Sept. 1984, 23p., In Portuguese.

This bulletin includes a report of Brazilian Air Force activities on King George Island related by the President of IBEA, A. Pinto Coelho, who participated in the expedition; a history of the institute, its current activities, an outline of its future research, and two short articles. For selected papers see A-30788 and G-30789.

A-30788

Pinto Coelho, A., **Brazilian toponymy of Antarctica** [Toponímia brasileira na Antártida], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Sept. 1984 No.3, p.12-13, In Portuguese.

The origin of Brazilian names given to various islands in the Grandidier Channel, and to some locations on the antarctic continent, associated with pioneer explorers of the area, is discussed. A map of the region is included.

A-30796

Ott, R.E., **Postal history of Soviet antarctic activities 1955-1977,** El Paso, Texas, American Society of Polar Philatelists, 1980, 140p., 18 refs.

DLC HE6183.A53O89

This handbook is a study of the postal history of the activities of the Soviet Union in Antarctica as documented by cancels, cachets and postal stationery that pertain to the establishment and operation of scientific research stations, traverses and flights to and within the antarctic continent. A discussion of the SAE cancels and cachets is followed by a station-by-station discussion with illustrative material of each station's types of cancels and cachets. The listing of station and expedition leaders is followed by a list of their research and support ships, exchange scientists from a variety of countries, and aviation activities. Items such as covers from U.S. Coast Guard ships making inspection visits and QSL cards from Soviet amateur radio operations in the Antarctic are discussed. The study ends with a summary of tourist ship cachets pertaining to the Soviet stations and a list of references concludes the text. (Auth.)

A-30797

Ridgeway, R., **Race for the seventh summit,** *Outside,* Aug. 1984 9(7), p.27-30, 70-72.

An account is given of an ambitious mountain climbing plan by two relatively inexperienced climbers: to climb the highest peak on each of the seven continents within a year's span. The peaks included Everest, McKinley, Kilimanjaro, Aconcagua (South America), Elbrus (Europe), Kosciusko (Australia) and the Vinson Massif in Antarctica. A brief outline is presented of their organizing the climbing teams and assembling the equipment for the expeditions. The Vinson phase of the expeditions was a technical success but the antarctic surprises very nearly did them in. Difficulties involved in organizing a private expedition to Antarctica without official support are mentioned.

A-30798

Australia. Department of Science and Technology. Antarctic Division, **Annual review 1983-84,** Canberra, 1984, 32p., Bibliography p.29-32.

A brief account is given of the Division's research programs in Antarctica and the changes and improvements in support areas, especially transportation, planned for later implementation. Transport upgrading investigations include runway construction at Casey and Davis and an Australian-owned ice-breaking research vessel. Numerous science programs are reviewed including marine science, land biology, glaciology, upper air physics, cosmic ray physics, and medical. Appendices list senior staff, committee representation, ANARE voyages, wintering personnel, summer field parties, and publications.

A-30800

German Democratic Republic. Nationalkomitee für Antarktisforschung, **25 years research activities of the GDR in the Antarctic,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, 64p., Fo
individual papers see 39-856 through 39-858 or A-30806,
B-30808, C-30803, C-30807, D-30810, E-30805, H-3080
I-30801, I-30802 and K-30804. Bibliography p.50-64.

The GDR celebrates its silver anniversary in Antarctica with t
special issue reviewing its research accomplishments alone and
cooperation with the Soviet Antarctic Expedition. In ten pap
highlights of this effort are discussed and progress made over the ye
is shown. Papers deal with satellite observations; geophysical inv
tigations; upper atmosphere studies; geological explorations; isot
analysis; geodetic-glaciological studies; biological and medical
search; and expeditions.

A-30806

Schütze, H., Fröhlich, K., **Isotope research in Antarctica**
Geodätische und geophysikalische Veröffentlichungen, Reihe 1, 1984 Special issue, p.28-31, With German and Russian summaries.

Isotope analysis is useful for studies in hydrology, meteorolo
geology, glaciology, paleoclimatology, and biology. Results
deuterium analyses of water in Schirmacher Ponds, in atmosphe
humidity, and in lichens, algae, and mosses are outlined. Pho
show investigators in field investigations.

A-30811

Barr, W., **Geographical aspects of the First International**
Polar Year, 1882-1883, *Association of American Geographers. Annals,* Dec. 1983 73(4), p.463-484, Refs p.482-484.

1983 marks the centennial of a milestone event in the history
scientific research in the polar regions, the First International Po
Year. A total of 14 stations was established in the polar regions
12 different nations, along with a number of subsidiary statio
Focusing primarily on meteorology, geomagnetism, and auroral st
ies, scientists at these stations carried out a standardized, synch
nized program of observations for a full calendar year. Concern
the marine environment the Dutch expedition, whose ship was ad
in the ice of the Kara Sea for the entire year, contributed very valua
observations on the nature and behavior of sea ice. In the South
Hemisphere a station was established by Germany on South Geor
and a supplementary observing station on the Falkland Islands.

A-30821

Koch, M., **Antarctic challenge: conflicting interests, cooperation, environmental protection, and economic development,** *Journal of maritime law and commerce,* Ja
1984 15(1), p.117-126.

Lectures and discussions of participants in an interdisciplin
symposium, held in Kiel, Germany, in June 1983 by groups with
active interest in Antarctica (see M-30439) are reviewed. The
tarctic Treaty, international cooperation in antarctic research, exp
tation of antarctic living marine resources and their conservation,
the present knowledge of antarctic mineral resources are the top
covered, primarily from a legal point of view.

A-30825

Frey, R., **Antarctica: the continent of scientists** [Antarktika, Kontinent der Forscher], *Urania,* 1984 60(8)
p.52-57, In German.

The physical setting and major features of the antarctic contin
are briefly described. A review is given of the involvement of

GDR in antarctic research and the accomplishments of GDR scientists alone and in cooperation with Soviet researchers. A list of antarctic stations arranged by nation of occupancy is accompanied by a chart color-coded to elevation and locating the stations and identifying major topographic features. The Antarctic Treaty is briefly mentioned.

A-30855
Dubrovin, L.I., Preobrazhenskaia, A.V., **Scientific research stations in the Antarctic, 1976-1982** [Nauchnye stantsii v Antarktike 1976-1982 **gg.**], ***Sovetskaia antarkticheskaia ekspeditsiia.*** *Informatsionnyĭ biulleten'*, 1984 No.105, p.69-74, In Russian. 15 refs.

Data on 43 stations belonging to 12 countries, their opening date, location and personnel in the winter of 1980 are tabulated. The 1980 winter personnel consisted of 78 people, 288 of whom were manning Soviet stations.

A-30858
Gould, L.M., **Cold,** Northfield, Minnesota, Carleton College, 1984, 213p.
DLC G850 1928 B95 1984

To this reprint edition of the original 1928 book about the first Byrd Antarctic Expedition, an Epilogue has been added which is based, with some updating, on the author's presentation to a Cosmos Club gathering in 1981. In it he emphasizes the significance of the 1928 expedition for the IGY and the significance of the IGY on the situation prevailing in Antarctica in 1984. The development of the Antarctic Treaty from the IGY is recounted and the special requirements, obligations, and responsibilities placed on the signatories to preserve the antarctic physical environment for scientific research free of political tensions and in accord with principles set forth in the charter of the United Nations are stressed. Possible development of potential natural resources is a cause for concern as is the debate in the United Nations looking forward to a larger role in antarctic matters. In the author's view, Antarctica's greatest treasure is its science and the continent should be preserved as a science laboratory.

A-30874
Rakusa-Suszczewski, S., **Polish scientific research in the Antarctic** [Issledovaniia pol'skikh uchenykh v Antarktike], ***Sovetskaia antarkticheskaia ekspeditsiia.*** *Informatsionnyĭ biulleten'*, 1984 No.106, p.66-69, In Russian.

This review of Polish activity in the Antarctic begins with the participation of two Polish scientists in the Belgian Antarctic Expedition of 1898, and continues with the inauguration, 60 years later, of the first Polish antarctic station. Polish participation in subsequent Soviet antarctic expeditions, from 1964 until the present, involving Poland in meteorological, geological, oceanographic, glaciological, and geophysical investigations, is also reviewed.

A-30939
International Whaling Commission. Committee for Whaling Statistics, **International whaling statistics, No.87 and 88,** Sandefjord, Norway, 1981, 63p.
DLC HD9469.W5H9

This publication embraces the world aggregate whaling results for 1980, i.e. the catch by Antarctic pelagic expeditions in the Southern Hemisphere in the 1979/80 season and the catch of shore stations during the calendar year 1980. The data are presented in the form of tables and include among others: total whale catch by area, size, species, gender, and country. The range of geographic areas emphasizes the global nature of whaling activities with antarctic waters being a prime hunting region. (Auth. mod.)

A-30940
International Whaling Commission. Committee for Whaling Statistics, **International whaling statistics, Nos.89 and 90,** Sandefjord, Norway, 1982, 63p.
DLC HD9469.W5H9

This publication embraces the world aggregate whaling results for 1981, i.e. the catch made by antarctic pelagic expeditions in the Southern Hemisphere in the 1980/81 season and coastal based cetacean catches during the calendar year 1981. The statistical data are based on catch reports sent to the Bureau of International Whaling Statistics, Sandefjord. The data are presented in the form of tables and include among others: total whale catch by area, size, species, gender, and country. The range of geographic areas emphasizes the global nature of whaling activities with antarctic waters being a prime hunting region. (Auth. mod.)

A-30960
Chapman, A.S., **U.S. observer team visits foreign research stations,** *Antarctic journal of the United States,* 1983 18(5), p.287-288.

During the period Jan. 17 to Mar. 10, 1983 a team of four U.S. observers, the seventh in the series, visited 14 foreign research stations in Antarctica. The USCGC *Polar Star* served as home and the base of operations during the observation tour. During the 47-day circumnavigation, the *Polar Star* covered approximately 7,500 nautical miles, westward from McMurdo Station to Palmer Station. Visits were made to four Soviet, three Australian and two Argentine stations, and one station each of France, Japan, South Africa, Federal Republic of Germany, and the United Kingdom. It was concluded that all stations visited were complying with the provisions and the spirit of the Antarctic Treaty.

A-30961
Hushen, W.T., Compton, B.E., **Polar Research Board: Antarctic-related activities June 1982 to June 1983,** *Antarctic journal of the United States,* 1983 18(5), p.288-290.

During the past year, the Board met twice, and its committees and *ad hoc* study groups held 15 meetings. The Board also published 11 reports—eight on special studies and activities and three annual reports. The primary activity of the Board was preparation of a report recommending research directions for the U.S. Antarctic Research Program. Work continued on the "Polar Research—A Strategy" series of studies through which the Board is recommending directions for polar research over the next 2 decades. The "strategy series" includes studies on the following topics: the marine ecosystem, the upper atmosphere and near-Earth space, scientific status and future directions, polar biomedical research, polar medicine, snow and ice, permafrost research needs, climatic change, and solid-Earth geosciences. International activity in 1982 centered on the 17th Meeting of SCAR in Leningrad, July 5-9. Planning continued on the second BIOMASS experiment scheduled for Dec. 1983-Mar. 1985. In addition the Board published its 24th annual report to SCAR on U.S. Antarctic research activities and its 13th report on earth sciences investigations in the USARP.

A-30965
Pyne, S.J., **IGY: the third great age of discovery,** *Antarctic journal of the United States,* 1983 18(5), p.295-296.

The International Geophysical Year (1957-1958) dramatized a new era of exploration by Western civilization. Like other eras, it exposed new geographic areas to inspection, inaugurated a particular style of exploration, and reflected, while it simultaneously helped to shape, new intellectual syndromes. And like previous eras, discovery lead to problems of political and intellectual assimilation. Conceived in this way, IGY announced the most recent of three ages of discovery that have developed since the Renaissance. Within IGY, the role of

Antarctica was fundamental, and the south polar regions became a point of departure for the Third Age at large.

A-30966

Holoviak, J.C., **Antarctic Research Series,** *Antarctic journal of the United States,* 1983 18(5), p.296.

The Antarctic Research Series is the publication medium for extensive reports on antarctic research that are too lengthy or comprehensive for inclusion in standard disciplinary journals. Subjects covered by the series include marine biology, oceanology, meteorology, upper atmospheric physics, terrestrial biology, snow and ice, human adaptability, and geology. Individual papers are published as they are completed—usually two or three in a softcover minibook. Each paper is assigned to a thematic volume. Individuals wishing to develop a thematic volume for the series must prepare a proposal for review by the Board of Associate Editors.

A-30967

Thuronyi, G.T., **Specialized literature reviews based on the *Antarctic Bibliography*,** *Antarctic journal of the United States,* 1983 18(5), p.297-298, 18 refs.

The Cold Regions Bibliography Project at the Library of Congress continues to abstract and index the world's antarctic literature, providing the only bibliographic service devoted exclusively to the Antarctic in the form of the monthly abstracting journal *Current Antarctic Literature* and its hard-bound 18-month cumulation, the *Antarctic Bibliography.* Coverage was begun in 1962 and thus is well past the 20-year mark. With a companion volume, *Antarctic Bibliography* 1951-1961, that was published retrospectively (in 1970), the coverage extends to over 30 years. A research topic from the *Antarctic Bibliography* "National Interests and International Cooperation" is briefly reviewed over a 30 year period in order to examine the research trends and developments in this subject, and to demonstrate how the bibliography can serve as the basis for specialized literature reviews. A chronological listing of 18 references is included.

A-31009

Buenos Aires. Instituto Antártico Argentino, **National report to S.C.A.R. on antarctic scientific activities for the years 1983/84 and planned program for 1984/1985: progress report No.26,** Buenos Aires, 1984, 31p., 18 refs.

In a general way this report describes Argentina's scientific activities in Antarctica during the winter of 1983 and the summer season of 1983/84, as well as the planned program for the summer season of 1984/85 and the winter of 1985. The research program was accomplished at six permanent stations and three other stations occupied temporarily; also from ships and aircraft. Twenty institutions and/or agencies participated in this program, some of them carrying out, totally or in part, their share of the work in the laboratories or offices at their own headquarters. Specific tasks are outlined in these categories: meteorology, ionospheric physics, geomagnetism, glaciology, geology and geophysics, oceanography, hydrography, and biology. Planned programs are reported in substantially the same format. (Auth. mod.)

A-31010

Royal Society of New Zealand. National Committee for Antarctic Research, **New Zealand antarctic research report to SCAR No.26, 1984: April 1983-March 1984 record of activities; April 1984-September 1984 current activities; October 1984-September 1985 planned activities,** Christchurch, April 1984, 28p., Bibliography p.20-24.

A summer support group, field parties, specialist scientists and worker visitors numbering 228 people were involved in the New Zealand Antarctic Research Programme during the summer season, 1983/84. During the winter of 1984, 11 men are wintering over at Scott Base. Related field activities undertaken in various locatior embraced the following disciplines: geology, geophysics, geochemi try, hydrology, glaciology, seismology, volcanology, botany, microb ology, marine biology, oceanography and ornithology. Research b base parties comprised observatory disciplines in seismology and gec magnetism. Ionosonde interpretations and D region ionospheric r search and recordings of earth currents were made from Scott Bas and the nearby unmanned station at Arrival Heights. Dire meteorological readings of automatic recordings of standar climatological data were taken at both Scott Base and Vanda Statior Psychological testing to monitor sensory and cognitive efficienc changes, and the measurement of psychological modalities i Antarctic personnel were undertaken at Scott Base. (Auth.)

A-31011

Japan. Science Council. National Committee on Antarctic Research, **Japanese antarctic research, 1984 report: I. February 1983-October 1984 record of activities II. April 1984-October 1985 planned activities,** Tokyo, June 1984, 74p., Bibliography p.43-71.

The report outlines scientific research completed at Showa an Mizuho stations and aboard the icebreaker *Shirase* during the reli expedition to Showa in the 1983-84 summer. Programs were pu sued in: atmospheric physics, meteorology, geomagnetism, seismolc gy, geophysics, geodesy and cartography, geology and geomorpholc gy, glaciology, geochemistry, marine meteorology, oceanography, b ology, microbiology, and human physiology. Specific projects withi these categories are shown with instruments used or types of observa tion or both. Planned programs are outlined in the same format.

A-31022

Santiago de Chile. Instituto Antártico Chileno, **Antarctic annotations. 1982** [Apuntes antárticos. 1982], Santiago de Chile, 1982, 126p., In Spanish.

DLC G845.A6

This is a compilation of general facts relative to the antarcti continent—of geographic, historical, political, economic, biologica and meteorological interest—and of specific notes on geodesy an cartography, glaciology, antarctic resources, satellite photography oceanography, ecology, geology, climate and marine biology, as teachers' aid for primary and secondary schools.

A-31024

Antarctic: preferred futures, constraints and choices, *New Zealand international review,* Sep./Oct. 1983 8(5), p.2-5.

This item reports on the proceedings of a seminar organized b the New Zealand Institute of International Affairs held at Victori University of Wellington in June 1983. Highlights of points made i various presentations are outlined. K. Brennan addressed majo questions which are now topics of debate among many states: a miner als regime; the common heritage concept; territorial claims; and via bility of the Antarctic Treaty. A. Graham discussed antarctic envi ronmental protection and D. Marshall described the Canadian experi ence in the Arctic.

A-31031

U.S. National Environmental Satellite, Data, and Information Service, **NESDIS environmental inventory No.1. Environmental data inventory for the antarctic area,** Washington, D.C., May 1984, 52p. PB85-107944.

This is the revised, updated version of an antarctic environmenta data inventory publication first issued in 1978. The purpose of publi cations in this series is to show in an easily understandable form th major types of environmental data available from the National Envi ronmental Satellite, Data, and Information Service (NESDIS) of th National Oceanic and Atmospheric Administration (NOAA), U.S

Department of Commerce. This publication provides information on the amounts, types, and distribution of NESDIS data holdings in the area from 50 S to the South Pole. The inventory includes plots showing locations of geophysical, meteorological, oceanographic and glaciological data.

A-31061
Zotikov, I.A., **Unveiling the secrets of the ice continent** [Za razgadkoĭ taĭn Ledianogo kontinenta], Moscow, Mysl', 1984, 248p., In Russian with English summary.

The 460 days spent by the author with the Fourth Soviet Antarctic Expedition, and one year with American scientists at McMurdo and Amundsen-Scott stations, are described in a narrative style. Antarctic phenomena, such as subglacial melting, warm lakes covered by permanent ice, and sea creatures found on glaciers, as well as the daily problems of personnel wintering over in Antarctica, are brought to life with interest and a touch of humor. Color photographs are included.

A-31122
Headland, R.K., **Wrecks, hulks and other vessel remains at South Georgia, Falkland Islands Dependencies,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.109-126, 14 refs.

Details of wrecks, hulks, scuttled vessels, etc. found on South Georgia are described in chronological order from 1796 to 1983. An outline map of South Georgia showing the sites of wrecks and vessel remains is included.

A-31153
Samsonov, S., **Deep down south,** *Science in USSR,* 1984 No.1, p.55-64.

A general account is given of a voyage to Antarctica and of the 365 days spent at Vostok Station by a Soviet scientist. Working and living conditions are described. Cooperation, in the form of exchange of information and visiting scientists from stations of other countries, is pointed out.

A-31242
Gernandt, H., **Antarctic adventure** [Erlebnis Antarktis], Berlin, Transpress, 1984, 284p., In German. 24 refs.

The memoir recounts activities of the GDR during the 1979/1980 summer season which entailed travel by ship, airplane, and helicopter along the coast of the northeastern quadrant of the continent, a visit to the inland station of Mirnyy, and to many of the national stations in this region. A background essay includes descriptions of the physical environment, history of antarctic discovery and exploration through the inception of the Antarctic Treaty. Some of the highlights of the 1979/80 summer season include the increased interest in the ice edge; descriptions of the visits to the various stations and the research programs in progress; and several vignettes of memorable events over the years. A lesson closes the memoir: Antarctica is a unique place where the environment and international motivation for cooperation in research have combined to produce a successful venture unknown elsewhere on earth.

A-31244
Moneta's years in the South Orkney Islands [Los años de Moneta en las islas Orcadas], *Antártida,* Feb. 1984 No.13, p.2-9, 42, In Spanish.

The history of the South Orkney Islands is reviewed through a narrative of four years spent in the Antarctic by one of Argentina's early meteorologists, Manuel Moneta. The installation of the first radio equipment by Argentine personnel on Laurie Island is briefly described.

A-31246
Giménez, A.H., **17th SCAR meeting in Leningrad** [XVII reunión del SCAR en Leningrado], *Antártida,* Feb. 1984 No.13, p.14-17, In Spanish.

The 17th SCAR meeting, held in Leningrad, USSR, June 28-July 9, 1982, is reviewed. Brief accounts are given of the working group meetings and discussions in the areas of antarctic telecommunications, oceanography, publications, biology—with special reference to the accomplishments of the BIOMASS program—logistics, atmospheric physics—including international magnetospheric investigations—and antarctic meteorology as part of global climatology studies.

A-31251
Antarctic marine biology symposium in Bariloche [Efectuóse en Bariloche un simposio sobre biología marina antártica], *Antártida,* Feb. 1984 No.13, p.53-54, In Spanish.

This article on a SCAR meeting in Bariloche, Argentina, June 6-12, 1983, summarizes the programs and results reported there, and lists the individual papers by title and author.

A-31252
Comerci, S.M., **Sociedad Científica Argentina and the initiation of Argentine antarctic activities** [La Sociedad Científica Argentina y una iniciativa precursora de nuestras actividades antárticas], *Antártida,* Feb. 1984 No.13, p.55-56, In Spanish.

The article includes a letter by the president of the Sociedad Científica Argentina addressed to the president of Argentina, Dr. Ramón Castillo, in 1943 proposing the initiation of yearly national antarctic expeditions, installation of stations and observatories in Antarctica, and the organization of various research programs in the Antarctic. The propositions were acted upon, and by 1947 the first yearly expedition took place, followed by the founding of the Instituto Antártico Argentino in 1951.

A-31253
Argentine antarctic demography [Demografía antártica argentina], *Antártida,* Feb. 1984 No.13, p.60-64, In Spanish.

Statistical data on Argentine stations' population, the marriages, births and deaths in Antarctica between 1904 and 1983, are presented.

A-31292
British Antarctic Survey, **Annual report, 1983-84,** Cambridge, Eng., Natural Environment Research Council, 1984, 104p., Refs. p.84-94.

General remarks are made concerning finance, staffing, antarctic facilities and communication; personnel awards are announced; distinguished visitors, and British and international meetings attended are listed. A resumé of antarctic activities is given for 1983 winter, 1983-1984 summer season, aircraft and ship operations, and the 1984 winter. Scientific programs are reviewed in considerable detail in solar-terrestrial physics; meteorology and climatology; chemistry, radiation and dynamics of the atmosphere; geology; field geophysics; glaciology; mapping; marine biology; bird and seal biology; terrestrial biology; and medical research. Included are lists of 1983-1984 publications, and staff at various locations, divisions, and ships.

A-31306
Möbus, G., **Frozen Antarctica—ice-free Arctic: past and future** [Vereiste Antarktis—eisfreie Arktis: Vergangenheit und Zukunft], *Naturwissenschaftliche Rundschau,* June 1982 35(6), p.114-115, In German.

A brief comparison is made of the two polar regions through geologic time based on sediments and drill cores obtained by *Glomar Challenger.* The development of the antarctic ice cover is traced through climatic changes which occurred in both hemispheres. Atmospheric CO2 concentrations over the years are also considered.

A-31323

Kertz, W., **History of antarctic research** [Die Geschichte der Antarktisforschung], *Naturwissenschaften,* 1984 71(12), p.599-608, In German with English summary.

The history of antarctic research is reviewed. Antarctica has been explored from the beginning mainly from a scientific point of view. It is an outstanding example of planned and organized cooperative research involving oceanographical, glaciological, geological, meteorological, biological, chemical, and physical methods. The development not only of technology but also of politics largely determined the opportunities for research. In the course of time international cooperation became more and more prevailing, culminating in the International Geophysical Year in 1957/58. Since then the Antarctic Treaty offers especially favorable conditions. (Auth. mod.)

A-31399

Kusunoki, K., **Indian and Brazilian activities in the Antarctic,** *Polar news,* Feb. 1984 No.38, p.49-51, In Japanese.

In September 1983 India and Brazil reached Consultative Party status of the Antarctic Treaty. The first Indian antarctic expedition aboard *Polarsirkel* in the 1980/81 season landed on the ice shelf near the former Russian station Lazarevskaya and set up an automatic weather station (Dakshin Gangotri) near the Russian Station Novolazarevskaya. Activities continued in the 1981/82 season, with the selection of research station and runway sites on the ice shelf at about 70S/12E. Brazilian activities in the 1982/83 summer on board the *Professor W. Besnard* and a Navy ship *Barão de Teffé* were in the vicinity of the Antarctic Peninsula and in the Weddell Sea for marine biological work and ice navigation experience. Brazilian observers visited other nations' ship and land stations. Brazil plans to participate in the BIOMASS/SIBEX program in 1983/84 season and to establish a summer station in the Antarctic Peninsula area in the same season.

A-31400

Kusunoki, K., **Monograph series Science in Antarctica,** *Polar news,* Feb. 1984 No.38, p.64-65, In Japanese.

Since 1982 a series of monographs in the Japanese language on Antarctic research has been compiled by the National Institute of Polar Research in Tokyo and published by Kokon Shoin (bookseller) in Tokyo. A total of 9 volumes covering a wide variety of scientific disciplines is expected to be published by the end of 1984. Contents of two published volumes entitled "Kori to Yuki (Ice and Snow)" and "Seibutsu (Biology)" are briefly introduced. The titles of the unpublished volumes are: general description; upper atmosphere and aurora; meteorology and oceanography; earth sciences; antarctic meteorites; human biology; and reference handbook.

A-31413

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno, Vol.4, No.2,** July-Dec. 1984, 56p., In Spanish.

This bulletin describes current research efforts by Chile, reports on various conferences, and includes short articles. For selected papers, see A-31419, A-31421, A-31423, B-31415, B-31416, E-31414, H-31420, M-31417, M-31418 and M-31422.

A-31419

Peake G., R., **Scientific Committee on Antarctic Research, SCAR** [El Comité Científico en Investigación Antártica, SCAR], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.18-28, In Spanish.

The origins and development of the first and second International Polar Year and the IGY, that led to the creation of SCAR in 1958, are traced. SCAR's constitution, its rules and regulations, membership, organization and administration, the various working groups and subcommittees, its finances, publications, symposia, programs and international relations, are reviewed.

A-31421

Pinochet de la Barra, O., **Fernández de Quirós: the determined seeker of Terra Australis** [Fernández de Quirós: el empecinado buscador de la Terra Australis], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.32-34, In Spanish. Extracted from a talk delivered to the Language Academy of Chile.

The political and religious difficulties of the visionary Pedro Fernández de Quirós to obtain, at the beginning of the 17th century, permission and money from the king of Spain to embark on a search of unknown lands in the Antarctic, are narrated.

A-31423

Historic FACH flight to the South Pole [Histórico vuelo FACH al Polo Sur], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.41-43, In Spanish.

The flight from Punta Arenas to Amundsen-Scott Station, accomplished by C. Sanhueza Corvalán, chief pilot of Chile's Air Force Twin Otter program on Nov. 30, 1984, and his observations on the working and living conditions at the American base, are reported.

A-31426

Argentine Republic. Dirección Nacional del Antártico, **National report to S.C.A.R. on antarctic scientific activities for the years 1983/84 and planned program for 1984/1985. Progress report No.26,** Buenos Aires, 1984, 29 leaves, 18 refs.

Programs in progress are listed with brief comments on elements of the observations, schedules, and instrumentation used. Locations and descriptions of permanent and summer stations are given. Disciplines included in the programs are: meteorology (surface, upper air, radiation, sunshine and rocket observations); environmental pollution and shipboard observations; ionosphere, geomagnetism; glaciology, geology, geophysics; oceanography, hydrography; physiology, and biology.

A-31429

Andersen, N.R., ed, Malahoff, A., ed, **Fate of fossil fuel CO2 in the oceans,** New York, Plenum Press, 1977, 749p., Refs. passim. For selected papers see E-31432, -31433, I-31430, J-31431 and J-31434.

DLC GC117.C37F37

This volume is a collection of 36 papers delivered at a symposium held in Hawaii, Jan. 16-20, 1976, by researchers representing a wide diversity of environmental science interests. The contents cover carbon in the atmosphere and in the ocean, carbonate dissolution, and sediments. Five of the papers discuss a CO2 anomaly at the South Pole and studies of deep-sea sediments, some collected in the Antarctic.

A-31453

Buxton, M., **Antarctic diary; a letter to her family,** Lavenham, Terence Dalton Limited, 1983, 78p.

This is a day-to-day account of a visit to the Antarctic Peninsula, the Falkland Islands and South Georgia Island, between Feb. 20 and March 24, 1982, by a British couple who were guests on board the H.M.S. *Endurance*. Photographs of the local scenery are included.

A-31468

Browne, M.W., **Antarctica: life's tenuous toehold,** *Discover,* March 1984 5(3), p.44-52.

American research going on in Antarctica on Weddell seals, freeze resistant fish, and the antarctic food chain, and life at America's four stations, is reviewed.

A-31478

Romero, R., **Argentine solidarity extended to unlimited distance** [La solidaridad argentina se extiende sin límites de distancia], *Antártida,* May 1982 No.12, p.16-18, In Spanish.

The operation involving a 10,000 km flight by an Argentine Air Force aircraft and crew, and dropping of spare parts requested by the American icebreaker *Polar Sea* which was having difficulties in the Weddell Sea, is described.

A-31479

Capdevila, R., **The first men to explore the south of the Filchner Ice Shelf were Argentines** [Los primeros hombres que exploraron el Sur de la Barrera de Filchner fueron argentinos], *Antártida,* May 1982 No.12, p.19, In Spanish. 6 refs.

After stating that four members of the Argentine army discovered and named several mountains and glaciers between their Belgrano Station and latitude 83 S, which have subsequently been rediscovered and renamed by Vivian Fuchs and his party, it is proposed for cartographic purposes and for the sake of clarity that the United Nations assign the Argentine names jointly with their British counterparts to the territory involved, in the Falkland-Malvinas manner.

A-31480

Argentine army's 30 years of antarctic activity [El Ejército Argentino en sus 30 años de actividad antártica], *Antártida,* May 1982 No.12, p.21-33, In Spanish.

Three decades of the Argentine army's activities in Antarctica are reviewed, from the construction of bases and refuges, to the expeditions organized from them by air, sea, and land. Some of the original maps and itineraries, together with photographs of personnel and equipment, are included.

A-31482

Comerci, S.M., **Rescue in Antarctica** [Rescate en la Antártida], *Antártida,* May 1982 No.12, p.35, In Spanish.

Three instances are recalled of Argentine response to requests for help concerning transportation of injured men—from British bases twice, and once from a German base—to ships where proper medical assistance could be rendered.

A-31485

Comerci, S.M., **Archeological rescue** [Rescate arqueológico], *Antártida,* May 1982 No.12, p.49-51, In Spanish.

Argentine involvement in the restoration and conservation of the historic site connected with the expeditions of Nordenskjöld (1901-1903) and Bruce (1902-1904) is reported. The original building is converted into a historic monument exhibiting utensils, equipment and personal items belonging to the explorers and found on the premises.

A-31486

Anonymous heroes [Héroes anónimos], *Antártida,* May 1982 No.12, p.52-59, In Spanish.

Thirty years of antarctic activities of one man first sergeant R.O. Alfonzo, a carpenter in the army, are reviewed, describing his participation in various mapping expeditions on the Antarctic Peninsula and on Filchner Ice Shelf, and including the one to the South Pole in 1965.

A-31575

High stakes in krill, *Pakistan agriculture,* July 1982 Vol.12, p.29-30.

In connection with the forthcoming first formal meeting of the Commission to Implement the Convention on Antarctic Marine Living Resources, the biological, technological and political aspects of krill exploitation are discussed.

A-31605

Wedding bells ring at the South Pole, *Federal Electric Corporation. FEC news,* Mar. 1985 No.109, p.3.

The wedding of two ITT Antarctic Services employees at 5AM February 11, 1985 at Amundsen-Scott Station is described. The ceremony was the first of its kind ever to be performed at the South Pole. The bride and groom work at McMurdo, she as support coordinator for scientific field parties, he as heavy equipment mechanic at Williams Field. A Naval Chaplain presided at the ceremony and the Commander of the Naval Support Force, Antarctica gave the bride away.

A-31626

Pinto Coelho, A., **New trends in Antarctica** [Novas tendências antárticas], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.2-6, In Portuguese.

The Antarctic Treaty, the status of Brazil as a consultative nation, recent research programs of various nations, and the antarctic resources are reviewed. Included is a map showing the possible occurrence of different minerals.

A-31628

Pinto Coelho, A., **King George and Elephant islands** [Ilhas Rei George e Elefante], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.11-13, In Portuguese.

The discovery of King George and Elephant islands by captain William Smith, in 1819, and the cartographic and geological explorations that followed, are outlined. The geographic location of the two islands, as part of the South Shetland Islands, is illustrated. Additional data show temperature, coordinates, and population of the four stations on King George I., the Brazilian Comandante Ferraz among them.

A-31629

Rangel Nunes, M., **Report on the participation in Operation Antarctica 3** [Relatório da participação na Operação Antártica 3], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.15-19, In Portuguese.

Activities carried out at the Brazilian station Comandante Ferraz in the first week of December, 1984, are described. They include: measurements of global radiation; study of resistance to local climate of Brazilian wood and three different kinds of sugar-cane seed; search for micrometeorites; collection of biological specimens; and ornithological observations.

A-31638

Kusunoki, K., **Record of antarctic observations: its content and significance** [Nankyoku no kansokushi], *Chiri,* March 1983 38(3), p.46-53, In Japanese.

The history of ancient and modern concepts of Antarctica before its actual discovery, and of the gradual exploration and exploitation of the continent and the seas surroundings it are reviewed. Japanese achievements during the last decades, leading to even more accurate data, are described.

A-31639

Omachi, K., **Natural resources of Antarctica** [Nankyoku tairiku no shigan mondai], *Chiri,* March 1983 38(3), p.54-60, 6 refs., In Japanese.

Antarctic natural resources have been attracting world attention. There are many reasons for this, but most directly, it is due to the two energy crises; the 1972 D.S.D.P. Ross Strait continental shelf natural gas discovery; and the announcement by the UN that manganese nodules be placed under international control. Among the natural resources, such as natural gas, petroleum, copper, chrome, nickel, tin, gold, rare gas elements, and mineral ore beds, there have been many claims by the respective countries of Great Britain (1917), New Zealand (1923), Australia (1933), France (1938), Norway (1939), Argentina (1955), and Chile (1940).

A-31673

Reid, J.S., Burns, G.B., **Impulse function program,** *Australian National Antarctic Research Expeditions. ANARE research notes,* March 1985 No.25, 41p., 3 refs.

This Research Note details the mathematics behind the development of a program to calculate the impulse function relating two arrays of data. These data arrays are discrete samples of the proposed driving and driven functions. The program is tested for its susceptibility to noise and non-linear variations between the input functions. The impulse function program and relevant test programs are listed and their use is described. (Auth.)

A-31674

International Union for Conservation of Nature and Natural Resources. **Bulletin, Vol.16, No.1/3,** Jan./March 1985, p.3.

It is reported that the Beardmore Base camp became a focal point of one of the first steps in IUCN's action plan for the southern continent, following the mandate given to the Secretariat by the Madrid General Assembly in November, 1984, to prepare a comprehensive program on Antarctica.

A-31675

International Union for Conservation of Nature and Natural Resources, **16th session of the General Assembly of IUCN, Madrid, Spain, 5-14 November 1984, Resolutions**, 1984, n.p.

In Resolution 16/8, the IUCN makes recommendations to the Antarctic Treaty Consultative Parties regarding antarctic environmental protection in the light of conservation, communication and consultation, research, and acceding to the Antarctic Treaty; it recalls pledges and recommendations at the Convention on the Conservation of Antarctic Marine Living Resources, 1980; it urges the Consultative and Treaty Parties to ensure that mineral activities carried on in the Antarctic have minimum environmental adverse effects; it pledges IUCN's continuing assistance in providing to the Secretary General of the United Nations its expertise concerning Antarctica. In Resolution 16/9, the 16th Session of the General Assembly of IUCN requests the Director General of IUCN to take all necessary steps to implement Resolution 16/8.

A-31683

Benninghoff, W.S., Bonner, W.N., **Man's impact on the antarctic environment: a procedure for evaluating impacts from scientific and logistic activities,** Cambridge, Scott Polar Research Institute, 1985, 56p., 25 refs.

Reviewed are the geographic setting and antarctic ecosystems, man's activities in the Antarctic and the criteria for identifying significant terrestrial, marine, and atmospheric impacts from such activities. For environmental impact assessment, procedures and formats are discussed which differ from procedures used for many other parts of the world. An appendix provides excerpts from Recommendation 12-3 of the Twelfth Antarctic Treaty Consultative Meeting, Canberra, 1983, and Paragraphs 17-19 of its Report.

A-31695

New Zealand Antarctic Society, **Antarctic, Vol.10, No.7,** Christchurch, 1985, p.234-280.

A report is given on the wide range of activities of the New Zealand antarctic plans for the 1984-85 season. Included in these activities are Cenozoic Investigations in the Ross Sea (CIROS); ice travel; coal deposit measures, studies in glaciology and hydrology; Adélie penguin census and nest behavior; summer research projects; University plans for work on Mt. Melbourne and Terra Nova Bay. Additional reports are given for international antarctic work plans. These include an international workshop on aspects of Antarctica to be held on Beardmore Glacier in Jan. 1985; krill research by Korean scientists; the U.S. program 1984-85; a new ship to be used by Norway; Australian ice runway studies at Casey and plans for the subantarctic islands; South Pole expeditions by private parties; the first Chinese antarctic expedition; construction of India's antarctic station; Japanese oil survey in Enderby Land; BAS projects; and East German geological work in the Wohlthat Mountains.

A-31696

Australia. Department of Science and Technology. Antarctic Division, **ANARE news, Mar. 1985,** Kingston, 1985, p.1-4 + 4p. insert.

Principal events reported include comprehensive marine studies made during a 45-day cruise of *Nella Dan* in Prydz Bay, Dec. 1984-Jan. 1985; the discovery of vertebrate fossils near Davis Station; an antarctic expedition by Chinese scientists in Nov. 1984; the eruption of Mawson Peak on Heard Island in Jan. 1985; the deployment of sea ice buoys off Davis and Mawson Stations; the anticipated testing of a kit of antarctic teaching materials in Tasmanian and Queensland schools. February weather data for Mawson, Davis, Casey, and Macquarie Island are tabulated. Expeditioners have bade farewell to summer visitors and are taking closer looks at their surroundings and themselves. Weather and work prevented filing a report from Mawson.

A-31726

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Bibliography of international dry valley publications, 1978-1984. Vol.2,** Christchurch, 1985, 55p.

This bibliography comprises 426 references to papers by authors from Antarctic Treaty nations who have carried out research in the dry valleys region of Antarctica. The material is arranged under sections according to primary scientific subject content. Within each section, items are arranged alphabetically by author surname. An author index is provided.

A-31732
Hempel, G., **Why polar research** [Wozu Polarforschung?], *Erzmetall,* Dec. 1984 37(12), p.577-584, In German with English summary.

The history and present state of the antarctic research program of the West German government is described. Antarctic geology, ecosystems, climate, and seasonal ice distribution are reviewed.

B. BIOLOGICAL SCIENCES

B-28976
Makarov, R.R., Maslennikov, V.V., Movchan, O.A., Soliankin, E.V., **Oceanographic conditions and regional characteristics of seasonal succession in plankton in coastal waters of the Antarctic Peninsula** [Okeanograficheskie usloviia i regional'nye osobennosti sezonnykh suktsessiĭ v planktone pribrezhnikh vod Antarkticheskogo poluostrova], *Antarktika; doklady komissii,* 1982 No.21, p.101-117, In Russian. 16 refs.

During three oceanological surveys in coastal waters of northwestern Antarctic Peninsula, in Jan. 1976 and 1978 and in Dec. 1978-Jan. 1979, characteristics of seasonal processes in plankton were recorded. Phytoplankton abundance, and growth and development of *Thysanoessa macrura* larvae were evaluated. Except in Jan. 1978, relatively late plankton development was observed on the coast itself. In the neighboring, more seaward areas, earlier phenophases were found. Only in the waters farther north was the seasonal development of plankton similar near to and far from the coast. The occurrence of an "oasis" zone on the coast in 1976 and 1979 coincided with the presence of relatively stagnant water areas over the shelf and continental slope. Hydrological conditions may predetermine the development of such "oasis" zones, interfering with the normal progress of the "phenological wave" from north to south.

B-28977
Makarov, R.R., **Ontogenetic migration of antarctic Euphausiids** [Ontogeneticheskie migratsii evfauziid Antarktiki], *Antarktika; doklady komissii,* 1982 No.21, p.118-132, In Russian. Refs. p.131-132.

From plankton samples collected in waters up to 1000 m deep off the northwestern coast of the Antarctic Peninsula and in the Scotia Sea, vertical distribution of the larval *Euphausia superba, E. frigida, E. triacantha, Thysanoessa macrura,* and *E. crystallorophias* was studied. In the first four—the oceanic—species the eggs and larvae at the nauplius and metanauplius stages predominate in the 500-1000 m layer. At the calyptopis 1 stage the larvae rise to the photic layer. Diurnal vertical migrations of the older larvae occur throughout the 500 or 1000 m layer. Among the *Euphausia,* spreading is observed at first on the generic level; on that of the species, at a later stage. The larvae of *E. superba* are found near the surface, those of *T. macrura* a little further down and, deeper yet, those of *E. frigida* and *E. triacantha* who surface at night. Diurnal vertical migrations of the larvae is influenced by iridescence which hinders their ascent at night.

B-28978
Shchedrina, Z.G., **Vertical distribution of agglutinating Foraminifera of the Southern Hemisphere from Soviet antarctic expedition data of 1955-1966** [Vertikal'noe raspredelenie aggliutiniruiushchikh foraminifer iuzhnogo polushariia po materialam Sovetskoĭ antarkticheskoĭ ekspeditsii 1955-1966 gg], *Antarktika; doklady komissii,* 1982 No.21, p.133-156, In Russian. 26 refs.

The species composition of agglutinating foraminifera by sectors and regions of the Southern Hemisphere from the Bay of Bengal to the antarctic coast, and their distribution by depth, is presented. The foraminiferal fauna of the Southern Hemisphere consists of species of different zoogeographical character: endemic, as well as forms more or less widely distributed in various areas of the ocean, excepting the Arctic Ocean. The fauna is characterized by high species endemism and low species development. The most specific fauna of agglutinating Foraminifera is found in the sublittoral zone of the northernmost and the southernmost areas of the Indian sector, related to the vast environmental differences in those regions.

B-28979
Filippova, IU.A., IUkhov, V.L., **New data on the genus *Alluroteuthis* Odner, 1923 *(Cephalopoda: Oegopsida)*** [Novye dannye o rode *Alluroteuthis* Odner, 1923 *(Cephalopoda: Oegopsida)*], *Antarktika; doklady komissii,* 1982 No.21, p.157-168, In Russian. 13 refs.

Based on recent data, obtained during the study of sperm whale feeding in the Antarctic, as well as from samples collected on "Akademik Knipovich", the first description of the poorly researched adult antarctic squid *Alluroteuthis antarcticus* is given. An accurate and complete diagnosis of the genus Alluroteuthis and the family Neoteuthidae is presented. A map showing the distribution of the species in the Antarctic is included. The role and place of the squid in the trophic chains of the Antarctic are evaluated.

B-28980
Kuz'mina, A.I., **Short-term variability of phytoplankton in the Pacific sector of the Antarctic, in the area off Balleny Islands, in March 1977** [Korotkoperiodnaia izmenchivost' fitoplanktona tikhookeanskogo sektora Antarktiki v raĭone ostrovov Balleni v marte 1977 g], *Antarktika; doklady komissii,* 1982 No.21, p.169-174, In Russian. 2 refs.

Analysis of phytoplankton sampled twice during the second half of March 1977 with a three-day interval from the 0 to 100 m layer in the area bounded by 65 deg 40 S to 66 deg 40 S and 159 deg 30 E to 162 deg 00 E revealed short term variability of the dominant species and of its abundance. A "bloom" of the sea, caused by the diatom *Rhizosolenia hebetata f. semispina,* was observed over the greater part of the area during the first survey. During the subsequent survey, however, the zone of the "bloom" was found to have contracted and the dominant species responsible for the "bloom" was found to have been replaced by *Thalassiothrix antarctica* among others. In this zone the development of zooplankton, and a more frequent occurrence of krill, was observed.

B-28984
Vogel, M., Nicolai, V., **Invertebrates collected at the old whaling station, Grytviken, South Georgia,** *Polar record,* Sep. 1983 21(135), p.607-609, 14 refs.

Specimens collected during February 1982 are shown in a table. These consisted mainly of species of Acari, Coleoptera, and Diptera gathered from pitfall traps near the abandoned buildings. Some out of doors collecting sites were also established at other locations on the island in tussock grass, grass-heath, and marsh-bog communities. Brief mention is made of earlier investigators at the island and their reports are cited.

B-28986
El-Sayed, S.Z., **Fourth BIOMASS progress report,** *Polar record,* Sep. 1983 21(135), p.627-629.

SIBEX planning continues with the BIOMASS Technical Group on Programme Implementation and Coordination agreeing to a seven point program of exercise objectives in regard to krill. Three major target areas have been delineated to include: the western approaches to the Antarctic Peninsula, Bransfield Strait, Scotia Ridge, and South Orkneys; East Wind Drift area between 60 and 80E, especially Prydz Bay; and the Pacific Sector about 160E. Progress of the BIOMASS data center is reported. A list of BIOMASS publications since SCAR XVII is included.

B-28992

Jouventin, P., Stahl, J.C., Weimerskirch, H., **Recolonization of Crozet Islands by fur seals *Arctocephalus tropicalis* and *Arctocephalus gazella*** [La recolonisation des îles Crozet par les otaries *Arctocephalus tropicalis* et *A. gazella*], *Mammalia,* 1982 46(4), p.505-514, In French with English summary. 15 refs.

After having been massacred a century ago, fur seals are now in the process of recolonizing the Crozet Islands. The different stages of recolonization are reviewed, as are the location of the breeding colony and the reasons for its choice. A census was taken of the harems, and their size and evolution analyzed. The Crozet breeding cycle is described, calving dates given and compared with those of other locations. Two species of fur seals frequent these waters, *A. tropicalis* and *A. gazella* and both species are found on Crozet, although the former in much larger numbers than the latter. Up to now, no other breeding colony of Kerguelen fur seals had been found in French Austral Territories, but one has just been discovered on Croy island that comprises 1200 animals.

B-28996

Shibata, N., **Extractability of muscular proteins of antarctic krill in media with different ionic strengths,** *Japanese Society of Scientific Fisheries. Bulletin,* May 1983 49(5), p.730-743, In Japanese with English summary. 3 refs.

Experiments were performed on antarctic krill *Euphausia superba* immediately after the catch. Whole krill was used as unwashed muscle and tail meat, peeled mechanically, was used as washed muscle. Extraction of protein was conducted by changing the medium and increasing the ionic strength from 0.05 to 1.00 and 0.1 M NaOH. It was found that protein of washed muscle was not extracted with a low ionic strength (0.25-0.50) medium, but most of the protein in unwashed muscle was rapidly extracted even with low ionic strength media. In SDS-gel electrophoretic patterns, the band of actin appeared in all extracts of different ionic strength media. The band of myosin chain was found only in the extract of low ionic strength (0.25) medium from unwashed muscle, while it was recognized in all extracts of media of various ionic strengths (0.25-1.00) from washed muscle. While the muscle homogenates in media of various ionic strengths were stored at 3C for 2 days, the extractable protein from unwashed muscle decreased; that from washed muscle increased. These results show that the extractability of muscular proteins from fresh krill in media of various ionic strengths is considerably influenced by freshness of muscle. (Auth.)

B-28997

Shibata, N., **Change in extractability of muscular protein of antarctic krill during storage,** *Japanese Society of Scientific Fisheries. Bulletin,* May 1983 49(5), p.745-749, In Japanese with English summary. 6 refs.

The change in extractability of muscular protein during storage of fresh muscle of antarctic krill *Euphausia superba* was studied. When the washed muscle free from digestive protease was stored by keeping it in water or 0.2 M NaCl solution at various temperatures for 2 hs, the protein extractable by 0.45 M NaCl-phosphate buffer (I = 0.50, pH 7.3) largely decreased at 25C. 0.2 M NaCl solution in the storage medium slightly enhanced the rate of decrease in extractable protein below 20C. When the homogenate of muscle containing hepatopancreas with phosphate buffer (I = 0.05, pH 7.3) or with 0.45 m NaCl-phosphate buffer was stored at 2C, the amounts of extractable protein from both homogenates decreased with the lapse of time. Degradation of muscular protein by digestive protease thus occurred, producing soluble fragments in low ionic strength medium at 2C. These results suggest that deterioration of muscular protein in antarctic krill proceeds in two different courses, at least. The first is a decrease of extractable protein by high ionic strength medium resulting from storage at high temperature. The second is an increase of soluble protein in low ionic strength medium resulting from the action of digestive protease at low temperature. (Auth.)

B-29027

Pushkin, A.F., **New species of *Austrodecidae (Pantopoda)* from the Antarctic** [Novye vidy *Austrodecidae (Pantopoda)* Antarktiki], *Akademii͡a nauk SSSR. Zoologicheskiĭ Institut. Issledovaniia fauny moreĭ,* 1977 Vol.21, p.54-59, In Russian with English summary. 4 refs.

The paper describes two new species of the genus *Austrodecus,* of which *A. oblongus* is referred to the breviceps and *A. kelpi* to the short-eyed group. Based on comparative morphological analysis and on the range of the short-eyed austrodecids it is concluded that the origin of this species is in the New Zealand shelf area. The occurrence of *A. kelpi* on floating algae off the coast of South Georgia suggests that this species may be the possible means for distribution of the short-eyed group to the coastal waters of subantarctic islands as far as the Kerguelen Islands.

B-29028

Smirnov, I.S., **New species of the genus *Ophiomisidium (Ophiuroidea)* from the subantarctic waters of the Indian Ocean** [Novyĭ vid roda *Ophimisidium (Ophiuroidea)* iz subantarkticheskikh vod Indiĭskogo okeana], *Akademii͡a nauk SSSR. Zoologicheskiĭ Institut. Issledovaniia fauny moreĭ,* 1977 Vol.21, p.105-108, In Russian with English summary. 2 refs.

A new species, *Ophiomisidium mirabile* Smirnov, found in the antarctic sector of the Indian Ocean, is described. It has well developed lateral arm-plates of the second segment of the arm, which do not develop into adoral plates.

B-29029

Andriiashev, A.P., **New species and a new subspecies of *Paraliparis* (Liparidae) from western Antarctica, Pt.2,** *Journal of ichthyology,* 1982 22(2), p.1-9, Translated from Voprosy ikhtiologii. 13 refs.

Besides the five known species of *Paraliparis* in the Scotia Sea, a new species and subspecies have been found and are described in this article. Additional data on the meristics and distribution of *P. gracilis,* which had been seen only in the vicinity of South Georgia but was now found also near South Orkney Islands, is presented. A key to *Paraliparis* species of West Antarctica is given.

B-29030

Chekunova, V.I., Naumov, A.G., **Energy metabolism and food requirements of the marbled notothenia, *Notothenia rossi marmorata* (Nototheniidae),** *Journal of ichthyology,* 1982 22(2), p.112-121, Translated from Voprosy ikhtiologii. 22 refs.

On the basis of experimental data, an equation of dependence of metabolism upon body weight is derived. The average daily ration for different age groups of marbled notothenia, *Notothenia rossi marmorata,* in different seasons of the year was calculated. The daily ration for young fishes is 2.8-3.6% of the body weight during the summer-autumn period and 7.4-8.9% for adults. The ration for young fishes in winter-spring period is 1.8-2.4%, and for sexually mature fish 1.1-1.3% of body weight. The krill, *E. superba* constitutes 43% of the total annual ration by weight. (Auth.)

B-29031

Efremenko, V.N., **Finding of *Bathylagus antarcticus* (Bathylagidae) eggs, their characteristics and distribution in the Scotia Sea,** *Journal of ichthyology,* 1982 22(2), p.135-137, Translated from Voprosy ikhtiologii. 12 refs.

The occurrence of *B. antarcticus* eggs in the Scotia Sea south of the Antarctic Convergence indicates that this species spawns in the summer and fall in the antarctic portion of the Scotia Sea at a depth of over 200 m. Development of the eggs occurs under the most favorable conditions for bathypelagic fish in the intermediate warm water mass. Similar distribution was seen for eggs of fish in the family Myctophidae in the Scotia Sea.

B-29034

Lee, R.E., Baust, J.G., **Respiratory metabolism of the antarctic tick, *Ixodes uriae*,** *Comparative biochemistry and physiology,* 1982 72A(1), p.167-171, 32 refs.

The respiratory metabolism of the Antarctic tick, *Ixodes uriae* White (Acari:Ixodidae) was investigated at Palmer Station during Jan. 1981. At 20 C the metabolic rate of females was 303 nl/mg live wt/hr, approximately three times that of males and engorged nymphs. Laboratory acclimation of females, males and nymphs to 0 and 10 C for 2 wk had no effect on respiration rates, suggesting that *I. uriae* lacks the ability for compensatory acclimation of respiration rate. Metabolic rates of temperate ixodids are similar to those for females of *I. uriae,* which suggests that metabolic cold adaptation is absent in this species. (Auth.)

B-29035

Boltovskoy, D., **Plankton collection on an industrial scale** [Obtención de plancton a escala industrial], Atlas del zooplancton del Atlántico Sudoccidental y métodos de trabajo con el zooplancton marino. Edited by D. Boltovskoy, Mar del Plata, Instituto Nacional de Investigación y Desarrollo Pesquero, 1981, p.61-65, In Spanish.

DLC QL123.A84

In this chapter the possibilities of using plankton as a food source are discussed. The exploitation of this resource is still in an experimental stage. One of the disadvantages mentioned is that plankton is usually found in low concentrations; inadequate palatability, low digestibility, high salt content and the possibility of the existence of toxic plankters are the others. The only plankton resource exploited up to now is the antarctic krill, *Euphausia superba,* that is found in high concentrations in the Antarctic. (Auth.)

B-29038

Boltovskoy, D., **Biological characteristics of the southwestern Atlantic** [Características biológicas del Atlántico Sudoccidental], Atlas del zooplancton del Atlántico Sudoccidental y métodos de trabajo con el zooplancton marino. Edited by D. Boltovskoy, Mar del Plata, Instituto Nacional de Investigación y Desarrollo Pesquero, 1981, p.239-251, In Spanish.

DLC QL123.A84

Literature on values and quality of primary productivity in waters surrounding Antarctica, and in the Antarctic Convergence and Antarctic Divergence, is reviewed. The most prominent feature, the cyclic nature of antarctic plankton, is pointed out and discussed.

B-29039

Antezana, T., Brinton, E., ***Euphausiacea,*** Atlas del zooplancton del Atlántico Sudoccidental y métodos de trabajo con el zooplancton marino. Edited by D. Boltovskoy, Mar del Plata, Instituto Nacional de Investigación y Desarrollo Pesquero, 1981, p.681-698, In Spanish.

DLC QL123.A84

In this chapter the morphological characteristics of the *Euphausiacea* are discussed. Classification and distribution tables, and identification keys, of the species in the southwestern Atlantic are given.

B-29044

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol. 4, Nos. 1 and 2,** College Station, Texas A&M University, 1982, 8p. and 10p.

The two 1982 issues report on FIBEX results and SIBEX progress; the CCAMLR meeting in Hobart in May/June 1982; the BIOMASS data center; the XVIIth SCAR meeting in Leningrad in June/July; SCOR/SCAR workshop in Nikko in May/June; SCOR/JOA workshop in Halifax in July; changes in the BIOMASS administrative structure of the group of specialists; the meeting of the Technical Group on Programme Implementation and coordination in Bremerhaven in Sep./Oct.; the International krill symposium at the University of North Carolina in October; the Indian expedition to Antarctica; Brazil's antarctic activities; the age structure of krill; and the working party on fish ecology.

B-29045

Kils, U., **Swimming behavior, swimming performance and energy balance of antarctic krill, *Euphausia superba*,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1981 No.3, 122p., For German original see 11B-22266. 57 refs.

The combination of four complexes, in situ under water observations, krill biometrics, respiratory measurements, and hydrodynamic measurements, allowed for the calculation of the energy budget of krill, using two different, independent methods. The extraordinary body size of the antarctic krill makes it possible for this animal to utilize the enormous, but fluctuating primary production of the Antarctic. On the other hand, the very large body size causes tremendous physiological and energetic liabilities: adult krill is much too heavy for its exclusively pelagic way of living; it does not possess a device to increase its buoyancy such as a swim-bladder or high oil content. Therefore, the krill has to defray a rather considerable amount of its metabolism to the struggle against sinking. This portion increases with body size implying that metabolism in krill increases in proportion to body weight. This extraordinary performance can only be accomplished in very well oxygenated waters which yields a correlation between krill distribution and hydrological regime. The minimum food requirements and the swimming speed necessary for obtaining the minimum amount of plankton filtered are estimated. Any lack of sufficient oxygen or sufficient food or any weakening of the animal results in an inevitable sinking to the bottom, entailing a high natural mortality. (Auth. mod.)

B-29046

Groscolas, R., Rodriguez, A., **Glucose and lactate kinetics and interrelations in an antarctic bird (emperor penguin),** *American journal of physiology,* May 1982 242(5), p.R458-R464, 37 refs.

The isotope single-injection method was used to investigate the glucose and lactate kinetics and the interrelationships between the glucose and lactate pools in fasting emperor penguins. Values are given for mean lactate and mean glucose concentration, replacement rate, pool, space and transit time. Values of maximum conversions of lactate into glucose and of glucose into lactate indicate that lactate is an effective gluconeogenic precursor and a major fate of glucose metabolism in fasting penguins. The lactate replacement rate and incorporation into glucose were related to the plasma lactate concentration, which suggests that the rate of formation of glucose from lactate is dependent on the availability of lactate. The glucose replacement rate and reduction into lactate were related with the plasma glucose concentration, suggesting that the rate of lactate formation from glucose is dependent on the plasma glucose concentration. In the fasting emperor penguin glucose and lactate availability is capable of regulating the rate at which these substrates are utilized and interconverted. This is the first evidence for such regulatory capacities in birds. (Auth. mod.)

B-29047

Parin, N.V., Kukuev, E.I., **Reestablishment of the validity of *Lampris immaculata* Gilchrist and the geographical distribution of Lampridae,** *Journal of ichthyology,* 1983 23(1), p.1-12, Translated from Voprosy ikhtiologii. Refs. p.10-12.

From the study of three opahs caught in the Scotia Sea, and from literature analysis, the existence of two species in the genus *Lampris,* previously considered monotypic, is shown. *Lampris guttatus* is widely distributed in the world ocean while the other species, *L. immaculatus,* occurs only in high and temperate latitudes of the Southern Hemisphere. The main diagnostic differences between the species are body depth, shape and coloration, and the relative arrangement of pectoral and abdominal fins. (Auth. mod.)

B-29049

Usher, M.B., Booth, R.G., Sparkes, K.E., **Review of progress in understanding the organization of communities of soil arthropods,** *Pedobiologia,* 1982 23(2), p.126-144, Refs. p.140-143.

Following a review of the communal, niche, and species interaction concepts and perturbation experiments of soil populations, the simple ecosystems of the Antarctic are discussed. Mites and Collembola inhabiting the mosses and lichens of Signy Island are the primary objects of this portion of the review.

B-29053

Ooizumi, T., Nakamura, M., Hashimoto, A., Arai, K., **Thermal denaturation of myofibrillar protein of antarctic krill and protective effect of sugar,** *Japanese Society of Scientific Fisheries. Bulletin,* 1983 49(6), p.967-974, In Japanese with English summary. 21 refs.

A fresh muscle of antarctic krill *Euphausia superba* was subjected to myofibril suspension (Mf). The KCl concentration and pH dependencies of its Ca-ATPase activity were found to be similar to those of Mf Ca-ATPase from the frozen surimi of antarctic krill, although a higher specific activity was estimated to that of fresh muscle. The effect of sugar (0.25-3.0 M) on the thermal denaturation (10-35 C) of Mf was studied in terms of the rate constant (kD) for inactivation of Ca-ATPase. The following results were obtained: (a) By extrapolating the linear plot of log kD vs. sorbitol (M) to the intercept of ordinate, the theoretical values of kD in the absence of sorbitol at various temperatures were obtained. (b) By increasing the concentration (M) of sorbitol, all thermodynamic parameters for the inactivation were increased. (c) The protective effect of sugar and sugar alcohol against the inactivation become lower in the order of lactitol, sucrose, sorbitol and glucose. These trends were identical with those observed against the thermal denaturation of chub mackerel Mf. (Auth.)

B-29054

Sato, M., Sato, Y., Tsuchiya, Y., **Distribution of meso-alpha-iminodipropionic acid and D-alpha-iminopropioacetic acid in a variety of aquatic organisms,** *Japanese Society of Scientific Fisheries. Bulletin,* 1982 48(10), p.1411-1414, 26 refs.

A method was established for quantitative determination of two analogous compounds, meso-alpha-iminodipropionic acid (IDPA) and D-alpha-iminopropioacetic acid (IPAA), found in marine molluscs and krill. This gives a high recovery, over 96 per cent, for both IDPA and IPAA. The distribution of the two compounds was studied in a variety of aquatic organisms by using this method. In mollusca, IDPA and IPAA were detected in many species of three main classes: Gastropoda, Pelecypoda, and Cephalopoda. The distribution pattern of the two compounds strongly resembles that of octopine. (Auth.)

B-29055

Kato, H., **Carotenoid colored minke whale from the Antarctic,** *Tokyo. Whales Research Institute. Scientific reports,* Dec. 1979 No.31, p.97-99, 4 refs.

A minke whale with an unusual body color, pinkish ventrally and laterally, was captured in the Antarctic while swimming with a whale of normal color, gray dorsally and white ventrally. Autopsy revealed that the skeleton and other areas normally white were flushed with a carotenoid color. Pigmentary analyses of skin, blubber and baleen plates will be performed in a later study.

B-29056

Kato, H., **Unusual minke whale with deformed jaw,** *Tokyo. Whales Research Institute. Scientific reports,* Dec. 1979 No.31, p.101-103, 4 refs.

A minke whale with an abbreviated rostrum, bent toward the lower jaw, was captured in the Antarctic. Examination of the blubber showed it to be of normal thickness, indicating that the abnormality caused no feeding impairment to the whale.

B-29059

Harradine, J., **Some mortality patterns of Greater Magellan geese on the Falkland Islands,** *Wildfowl,* 1982 Vol.33, p.7-11, 18 refs.

Intestinal parasites were commonly present in wild Greater Magellan Geese. Congregation on short pastures, especially in winter when stress from food shortage can occur, facilitates the transmission of gizzard worm and probably contributes to the periodic die-offs. A 1:1 sex ratio was found at hatching and around fledging but the ratio was 1:1.3 amongst sub-adult and adult Greater Magellan Geese. The reasons for the differential mortality of males are not clear but may include their greater susceptibility to food shortage and its enhancement of disease, and hunting mortality. (Auth. mod.)

B-29060

Oliver, P.G., ***Notoficula* Thiele, a neotenous genus of eratoid gastropod from Antarctica,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.1-6, 12 refs.

A new species of *Notoficula* is described from Signy Island. This genus was originally placed within the Buccinacea but the anatomy and radula show a clear relationship to the Lamellariacea. *Notoficula* is compared with other Lamellariacean groups and is shown to be most closely related to the Eratoidae. It is postulated that *Notoficula* arose by a neotenous event from eratoid stock. (Auth.)

B-29061

Booth, R.G., **Description of the juvenile life-stages of the antarctic mite *Ereynetes macquariensis*,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.7-12, 11 refs.

The juvenile life-stages of *Ereynetes macquariensis* Fain, a commonly occurring antarctic and subantarctic prostigmatid mite, are described with particular reference to the leg chaetotaxy and the structure of the genital field. The larval and protonymphal stages are described for the first time, and corrections are made to previous descriptions. The protonymph is recognized by the lack of setae on all the segments of leg IV except for the tarsus and by the simple structure of the genital field. Deutonymphs and tritonymphs are readily distinguishable, having three and eight pairs of setae in the genital area respectively. (Auth.)

B-29062

Jellings, A.J., Usher, M.B., Leech, R.M., **Variation in the chloroplast to cell area index in *Deschampsia antarctica* along a 16 deg latitudinal gradient,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.13-20, 13 refs.

Samples from leaves of *Deschampsia antarctica* Desv. taken from sites along a 16 deg latitudinal gradient from the Falkland Islands to the Refuge Islands exhibit a chloroplast to cell area index cline ranging from 0.38 to 0.96. This was the result of variation in cell size, chloroplast size, and to a lesser extent the number of chloroplasts, between samples taken from different sites. This cline was not related to the mean daily hours of sunshine along the transect at the time of collection, but did show an inverse relationship with the temperature at each site. (Auth.)

B-29063

Lishman, G.S., Croxall, J.P., **Diving depths of the chinstrap penguin *Pygoscelis antarctica*,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.21-25, 12 refs.

Diving depths of four breeding chinstrap penguins were recorded throughout complete foraging trips to sea lasting 18-48 h at Signy Island. Deeper dives reached 70 m but 90% of dives were shallower than 45 m and 40% were to less than 10 m. The diving pattern is compared with those of king penguins and antarctic fur seals. Chinstrap penguins feed on krill and it is suggested that they do so chiefly during shallow dives at night when krill are near the surface. Using data on average measurements and weight of krill taken by chinstraps at Signy Island, and estimates of at-sea metabolic rate and the size of meals delivered to their chicks by the study birds, it is calculated that about 16 krill are caught per dive of duration c. 1.6 min. (Auth.)

B-29064

North, A.W., Croxall, J.P., Doidge, D.W., **Fish prey of the antarctic fur seal *Arctocephalus gazella* at South Georgia,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.27-37, Refs. p.34-35.

A small collection of otoliths was obtained from scats of sub-adult male antarctic fur seals *Arctocephalus gazella* at Bird Island, South Georgia. A reference collection of otoliths from South Georgia fish was used to identify the material and to derive relationships between otolith length and fish weight which were then applied to the sample otoliths, after correcting for loss of material during digestion. Individual scat samples contained remains which represented a weight of 80-2000 g of fish, and in all but one case a single species accounted for over 80% of this. Fish formed a very small portion of the fur seals' diet in summer. The fish taken were mainly epi-pelagic, krill-feeding species. This is in line with the diet and diving patterns of *A. gazella* which feeds principally on krill in the upper water layer, and it is likely that the seals take fish from shoals associated with krill. Studies of otolith digestion rates and more data on relationships between otolith length and fish weight would greatly improve the future analysis in similar studies. (Auth.)

B-29065

Burchett, M.S., **Abundance of the nearshore fish population at South Georgia (Antarctica) sampled by trammel net,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.39-43, 4 refs.

Juvenile *Notothenia rossii, Notothenia neglecta, Parachaenichthys georgianus* and *Chaenocephalus aceratus* were the mos commonly occurring fish species sampled by trammel nets in the 0 90 m depth zone nearshore at South Georgia. Juvenile *N. rossi* dominated the nearshore catches both in abundance (77%) and biomass (61%). Together, the four fish species comprise 95% of all fish sampled and 97% of the total biomass caught by trammel net. There were large seasonal variations in the numbers of *N. neglecta, P. georgianus* and *C. aceratus* in coastal habitats at South Georgia. Only numbers of *N. rossii* remained consistently high throughout the year Overall, the numbers of each fish species were high in summer months from November to July and reduced during the winter period from August to October. (Auth.)

B-29066

Burchett, M.S., **Food, feeding and behaviour of *Notothenia rossii* nearshore at South Georgia,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.45-51, 6 refs.

Blue phase (pelagic) fingerlings of *Notothenia rossii* sampled nearshore were feeding primarily on small planktonic organisms such as copepods, amphipods, fish larvae and decapod larvae. Sixty-two percent of the stomachs contained one major prey item. At the juvenile demersal stage of the life-cycle, the diet of the fish had changed considerably and the most abundant components of the stomach contents were amphipods, algae, isopods and small fish. Although amphipods were most important by numbers (55%), fish made up the bulk of the diet by weight (43%), followed by amphipods (20%) and algae (9%). Only two dietary components, amphipods and algae, were eaten in quantity throughout the year. The regularity and amount of algae consumed confirms that it is a specific food item and not ingested by accident. Although there was much local movement of juvenile *N. rossii* within King Edward Cove, the prime habitats chosen by the fish were areas of dense macroalgal cover. *Notothenia rossi* dispersed from open areas of sparse macroalgal cover and aggregated in places affording greater protection. (Auth.)

B-29067

Newton, M.E., **Synoptic flora of South Georgian mosses: *Campylium*,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.53-58, 6 refs.

Campylium polygamum (B.S.G.) C. Jens., the only species of the genus known from South Georgia, is described and illustrated. Notes to assist in its identification are provided, as are habitat details and a map of the species' distribution on the island, together with notes on its taxonomy. (Auth.)

B-29068

Brook, A.J., Williamson, D.B., **Desmids from some lakes on Signy Island, South Orkney Islands, Antarctica,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.59-70, 23 refs.

From material collected in several lakes on Signy Island, five new taxa have been added to the sparse desmid flora of the antarctic and subantarctic. These are *Closterium parvulum var. parvulum Näg.*, *Cosmarium margaritatum* (Lund) Roy & Biss forma., *C. binum* Nordst., *C. sexangulare* var. *minus* Roy and Biss. and a *Cosmarium* new to science, here named *C. decussare.* In fresh material from Signy Island, *Roya anglica* G.S. West and *Closterium jenneri* var. *jenneri* were found in laboratory cultures. These are also new records for the region. (Auth.)

B-29069

Burchett, M.S., **Life cycle of *Notothenia rossii* from South Georgia,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.71-73, 10 refs.

Several distinct stages of the life-cycle of *Notothenia rossii* at South Georgia are described. They include the offshore pelagic larvae, post larvae and young fingerling stages. The young fingerling metamorphoses into a blue phase fingerling and this stage migrates to the nearshore environment where it changes into a brown phase fingerling. In turn this stage develops into a demersal juvenile which inhabits the coastal beds of macroalgae before migrating offshore to join the adult population. Once offshore, adults remain over the continental shelf areas of South Georgia. They have not been recorded migrating away from the island.

B-29070

Bell, B.G., **Type specimen of the moss *Dicranum oleodictyon* Dix,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.74, 3 refs.

The type specimen of the moss *Dicranum oleodictyon* Dix. has been traced. Examination of it confirms the identification of material from South Georgia and the South Orkney Islands. (Auth.)

B-29072

Lee, J.-H., Fujimoto, K., Kaneda, T., **Peroxide-decomposing activities of antarctic krill lipids and certain other oils,** *Agricultural and biological chemistry,* Sep. 1983 47(9), p.2001-2007, 25 refs.

The peroxide-decomposing activities of phospholipid fractions obtained from krill, egg yolk, soybean, rice bran, and sunflower seed were compared. The peroxide-decomposing activities of the total lipids depended upon the phospholipid contents. The phospholipid fractions from krill, egg yolk, and soybean did not show any antioxidative activities, but the peroxide-decomposing properties which varied somewhat among the sources were clearly observed. The most peroxide-decomposing activity was demonstrated by the phospholipid fraction of krill, followed by that of egg yolk. The existence of oxidation products of phospholipids were presumed to be responsible for the decomposition of lipid peroxides. (Auth.)

B-29073

Hidaka, H., Tanabe, S., Tatsukawa, R., **DDT compounds and PCB isomers and congeners in Weddell seals and their fate in the antarctic marine ecosystem,** *Agricultural and biological chemistry,* Sep. 1983 47(9), p.2009-2017, 27 refs.

The whole-body burdens and concentrations of DDE/DDT and PCBs in the Weddell seal, *Leptonychotes weddelli,* caught near Showa Station were determined by detailed biometric measurements of their organs and tissues. The concentration levels of DDE/DDT and PCBs in Weddell seals were much lower than those in various species of marine mammals from other oceans. The low levels may be attributable to the low concentration of these chemicals in the food of Weddell seals and in the sea water under antarctic fast ice. However, the concentration ratio of DDE/DDT between the food organisms of seals and sea water under antarctic fast ice was higher than those of other ocean ecosystems. (Auth.)

B-29074

Block, W., **Low temperature effects on micro-arthropods,** *Journal of thermal biology,* 1981 6(4), p.215-218, 28 refs.

The main features of the cold hardiness strategies adopted by Antarctic terrestrial arthropods (principally Acari and Collembola) are reviewed. These include lethal low temperatures, chill-coma temperature, supercooling ability, cryoprotectants and survival in anoxic conditions. (Auth.)

B-29081

Liubimova, T.G., ed, Makarov, R.R., ed, Kamenskaia, E.A., ed, **Antarctic krill. The distribution pattern and environment** [Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda], Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, 136p., In Russian with English summaries. For individual papers see B 29084 through 29088, 29091, 29093 through 29095, I 29083, J 29082, 29089, 29090 and 29092.

This is a collection of fourteen papers dealing with geomorphology, atmospheric processes, primary productivity, copepods, euphausiids—especially krill—and oceanography of the Atlantic and Indian Ocean sectors of the southern ocean.

B-29084

Savich, M.S., Mashtakova, G.P., **Regularities of phytoplankton development in the Sodruzhestvo Sea** [Zakonomernosti razvitiia fitoplanktona v raĭone moria Sodruzhestva], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.26-34, In Russian with English summary.

An analysis of regularities of phytoplankton development in the Sodruzhestvo Sea in the summers of 1977-1979 indicates that the qualitative composition of phytoplankton varies each year. Diatoms prevail in terms of number of species and qualitative composition. As its mean long-term biomass of phytoplankton is 635 mg/cu m, the Sodruzhestvo Sea belongs to the category of productive water bodies. Some highly productive zones (in terms of phytoplankton) are recorded along the Antarctic coast, in the Prudes Bay and in the outlying parts of cyclonic eddies. The vertical distribution of phytoplankton depends on the presence of a seasonal thermocline and the depth of its lay. (Auth.)

B-29085

Makarov, R.R., **Distribution pattern of phytoplankton in Lazarev Sea** [Osobennosti rasprostraneniia fitoplanktona v more Lazareva], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.34-41, In Russian with English summary. 17 refs.

An analysis of the distribution of seven species of diatoms has indicated two zones: the coastal zone, associated with the extension of the East Wind Drift, characterized by the development of *Corethron criophilum,* and the oceanic zone, corresponding to the East Weddell Drift water, where *Thalassiothrix antarctica* prevails. Towards the south, the standing crop of phytoplankton increases gradually in the oceanic zone, and earlier phases of the phenological state of plankton occur more frequently. In the coastal zone, due to irregularities in the current field and floating ice, the phytoplankton biomass is concentrated in patches. The boundary between the waters of the two modifications is better revealed by the species composition of phytoplankton than by the distribution of the total biomass of diatoms. This also applies to the boundary of the inshore water of the eastern Atlantic Ocean. (Auth.)

B-29086

Vladimirskaia, E.V., **Population number and composition of antarctic mass species of copepods *Calanus propinquus*, *Calanoides acutus* and *Rhincalanus gigas* in the Lazarev Sea in March 1981** [Chislennost' i sostav populiatsiĭ massovykh vidov antarkticheskikh kopepod *Calanus propinquus*, *Calanoides acutus* i *Rhincalanus gigas* v marte 1981g. v more Lazareva], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.41-50, In Russian with English summary.

The standing crop and age frequency distribution of the population of mass species of copepods, in the 0-100 m layer of Lazarev Sea in the area from 63 S to the Antarctic coast, and from 10 W to 14 E, showed substantial regional and seasonal differences. The development rate of *C. propinquus* in the Antarctic Coastal Current is lower than in the Weddell Sea Drift. Development of *C. acutus* was observed in the northern part of the oceanic area and in the narrow coastal zone; no development was observed in the southern area, and the population was represented by the wintering stock. Development of *R. gigas* was observed in the northern oceanic area and only single older copepodites occurred in the southern area. The standing crop of plankton is higher in the inshore Antarctic waters and in some part of the Lazarev Sea than in the Antarctic Coastal Current, due to the East Weddell Sea Drift. (Auth.)

B-29087

Aseev, IU.P., Rubinshteĭn, I.G., **Winter distribution of euphausiids in the southwestern Indian Ocean** [Raspredelenie evfauziid v iugo-zapadnoĭ chasti Indiĭskogo okeana v zimniĭ period], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.50-57, In Russian with English summary. 8 refs.

Catches made in the area from the ice edge to 40 S and from 30 to 60 E included 13 species of euphausiids. The analysis of the latitudinal distribution indicates that all species are divided into two natural groups, Antarctic and notal. The division between their habitats, as in other areas of the southern ocean, is the Antarctic Convergence Zone. (Auth.)

B-29088

Soliankin, E.V., Sysoeva, M.V., Khvatskiĭ, N.V., **Water dynamics and conditions for krill clusters in the Lazarev Sea** [Dinamika vod i usloviia obrazovaniia skopleniĭ krilia v more Lazareva], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.57-66, In Russian with English summary. 6 refs.

The field of geostrophic currents, the distribution of krill catches and hydroacoustic data on krill concentrations are presented on the basis of oceanographic surveys made on board *Akademik Knipovich* in March 1981. The presence of two relatively isolated systems of horizontal circulation of water in the Lazarev Sea leads to formation of noticeable background heterogeneities in the qualitative composition of *E. superba* and in the general state of the euphausiid stock. Aggregations of krill occurred mainly in the zone influenced by the Antarctic Coastal Current and primarily in the eastern part of it. This is associated with distinctly expressed heterogeneity of the current field in the area. There are no favorable dynamic conditions for the concentration of euphausiids in the Abyssal Plain area north of the Antarctic Coastal Current because of homogeneity of the current field. (Auth.)

B-29091

Kozlov, A.N., **Hydrological conditions, distribation an
biology of krill in the southern section of Scotia Sea**
[Gidrologicheskie usloviia, raspredelenie i biologichesko
sostoianie antarkticheskogo krilia v iuzhnoĭ chasti moria
Skotiia], Antarkticheskiĭ kril'. Osobennosti raspredeler
i sreda. Edited by T.G. Liubimova, R.R. Makarov, an
E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia
Promyshlennost', 1983, p.85-98, In Russian with Englis
summary. 13 refs.

Hydroacoustic and oceanographic surveys of the distributi
krill were made on board *Odissey* in the secondary frontal zone
Scotia Sea in the summer of 1981. Swarms of krill extending to
eral dozen meters with densities of 350 specimens per cu m or
occurred frequently. In clusters of krill extending to several hu
meters the density was rarely over 100 specimens per cu m. We
Sea water was widely distributed in the southern part of the Scoti
Krill occurred almost everywhere, but dense clusters were assoc
with Weddell Sea water. East of 40 W no large clusters of krill
found because of the inconsistent forms of water circulation. Th
tense development of phytoplankton affects adversely the proce
concentration of krill. Adolescent and adult specimens, two
size-age groups, occurred in the area. After spawning the propo
of the latter was reduced. Most adolescent specimens drifted
water of a mixed origin extending along the frontal zone
(Auth.)

B-29093

Aseev, IU.P., **Life span of krill derived from populatio
size structure in the Indian Ocean** [Razmernaia struktu
populiatsii krilia i prodolzhitel'nost' ego zhizni v
Indookeanskom sektore Antarktiki], Antarkticheskiĭ kri
Osobennosti raspredeleniia i sreda. Edited by T.G.
Liubimova, R.R. Makarov, and E.A. Kamenskaia, Mosc
Legkaia i Pishchevaia Promyshlennost', 1983, p.103-110
Russian with English summary. 18 refs.

Based on size frequency distribution of krill in time and space
the application of various research methods in the studying of th
structure of krill from the Indian Ocean sector of the Antarctic,
found that the maximum life span of krill is 5 years. (Auth.)

B-29094

Makarov, R.R., Sysoeva, M.V., **Biology and distributio
Euphausia superba Dana in the Lazarev Sea and adjac
waters** [Biologicheskoe sostoianie i raspredelenie *Eupha*
superba Dana v more Lazareva i sopredel'nykh vodakh]
Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sred
Edited by T.G. Liubimova, R.R. Makarov, and E.A.
Kamenskaia, Moscow, Legkaia i Pishchevaia
Promyshlennost', 1983, p.110-117, In Russian with Eng
summary. 11 refs.

Analysis of the distribution of various size groups of *E. sup*
in the Lazarev Sea in March 1981 revealed six groups, but only t
occurred frequently and were identified as certain generations o
phausiids. Comparison studies revealed two isolated structural
of the population of *E. superba* (subpopulations) drifting with w
of different modifications in the opposite direction. In the south,
subpopulation inhabits the water of the East Wind Drift. Its co
sition includes all three size groups: adolescents, an interme
group (adolescents and small-sized mature specimens) and
specimens with corresponding model sizes of 30-40, 40-43 and 4
mm. In the north, the other subpopulation inhabits the water o
East Weddell Drift. The life span of specimens from the nort
subpopulation is one year shorter than that of specimens from
southern subpopulation. By March the spawning of *E. super*
both subpopulations was completed. (Auth.)

B-29095

Samyshev, E.Z., Lushov, A.I., **Food ration and its balance values in antarctic krill** [Pishchevoĭ ratsion i ego balansovye velichiny u antarkticheskogo kriliia], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.117-127, In Russian with English summary. 11 refs.

The metabolic intensity of krill, length increment and undigested food were investigated by the oxygen and radiocarbon uptake methods under field conditions. The food rations are calculated by the sum of balance values. It is found that the minimum period of acclimation of krill to experimental conditions ranges from 6 to 12 hours depending on size. The maximum metabolic intensity in adult specimens was observed in the afternoon or at midnight. The threshold concentration of food in the feeding period of krill is 0.05/mg. The coefficient of utilization of food for growth (K2) is lower in specimens 16-50 mm long. (Auth.)

B-29096

Tomkins, R.J., **Fertilisation of Wandering Albatross eggs on Macquarie Island,** *Notornis,* Sep. 1983 30(3), p.244-246, 5 refs.

The author records his observations of copulatory behavior among the albatrosses. From these observations the relationship between the time of copulation and the time of fertilization was inferred.

B-29097

Cowen, A.N., **"Large" snow petrels *(Pagodroma nivea)* breeding at the South Sandwich Islands,** *Notornis,* Sep. 1983 30(3), p.250-252, 5 refs.

The author recounts his observations of this species on the South Sandwich Islands and at other places on or near the antarctic continent. He questions the prevailing view that this species is limited to Dumont d'Urville and the Balleny Islands as breeding grounds.

B-29135

Castrelos, O.D., Ikonicoff, S., Zunino, C.H., Smayevsky, J., Margni, R.A., **Microbiology of Antarctica. 1. Some microbiological observations carried out in Paradise Harbor** [Microbiología de la Antártida. 1. Algunas observaciones microbiológicas realizadas en Puerto Paraíso], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.263, 20p., In Spanish with English, French and German summaries. 26 refs.

During 1978 the periodical examination of fecal matter of gulls and antarctic pigeons wintering in the proximity of Brown Station was carried out. The results show a correlation with those of Esperanza, such as the pollution produced by man, the purification observed at sea and accelerated by the effects of winds and low temperature and, mainly, the effect of penguins on antarctic ecology. More than 120 samples of bird droppings were processed. In all cases of fresh samples—apart from gram positive cocci and bacilli—*Escherichia coli* strains were recovered. The *Enterobacter aerogene* and *cloacae* species have also been isolated from gull droppings. In the aged samples it was observed that as more time elapsed since their deposition on the snow, a purification, with diminishing numbers of gram-negative germs and survival of gram-positive cocci, was taking place. (Auth.)

B-29137

Vergani, D.F., Tomo, A.P., **Study of basal metabolism of three species of the genus *Trematomus*** [Estudio del metabolismo basal de tres especies del género *Trematomus*], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.268, 21p., In Spanish with English, French and German summaries. 5 refs.

The object of this work was to study the metabolism of the *Trematomus hansoni, Trematomus bernacchii* and *Trematomus newnesi* species, to determine whether the differences in their habitat had produced differences in their basal metabolism. Data were processed through the calculation of regression straight lines, using the slope of the line as consumption expression, in units of ml/gr/hour. The comparison was made through covariance analysis. On comparing metabolism of the three species no significant differences were found. (Auth.)

B-29138

Vergani, D.F., Tomo, A.P., **Determination of nitrogen assimilation and elimination in *Trematomus newnesi* (Boulenger, 1902)** [Determinación de la asimilación y excreción de nitrógeno en *Trematomus newnesi* (Boulenger, 1902)], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.269, 19p., In Spanish with English, French and German summaries. 5 refs.

The object of this work was to learn the feeding requirements and assimilation of *T. newnesi.* Nitrogen was taken as the parameter. Experiments were carried out by feeding *T. newnesi* on planktonic amphipoda. Food concentrations were obtained from stomach contents of fishes captured in their natural habitat. Nitrogen concentrations were determined following the Kjeldahl method, modified for low concentrations by the Chemical Oceanography Division. (Auth.)

B-29139

Tomo, A.P., Torno, A.E., **Results of the biological and fishing cruise on board the ship *Antártida* in the Elephant Island area** [Resultados de la campaña biológico-pesquera del B/R "Antártida" en el area de isla Elefante], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.272, 26p., In Spanish with English, French and German summaries. 3 refs.

Results of a biological-fishing cruise on board the ship *Antartida* in the waters adjacent to Elephant and South Orkney Islands are presented. The species studied are: *Champsocephalus gunnari, Chaenocephalus aceratus, Chionodraco hamatus* and *Notothenia gibberifrons.* Results of an analysis of length variations in relation to depth, and of the relationship between length, weight and feeding are reported. (Auth.)

B-29141

Ageitos, J.M., **Determination and distribution of benthonic invertebrates of two subantarctic localities** [Determinación y distribución de invertebrados bentónicos en dos localidades subantárticas], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.277, 12p., In Spanish with English, French and German summaries. 6 refs.

On the basis of benthonic samplings carried out in waters surrounding the South Georgia and South Sandwich Islands, lists showing the distribution and variety of benthonic fauna are presented.

B-29142

Ikonicoff, S., Zunino, C.H., Smayevsky, J., Castrelos, O.D., Margni, R.A., **Antarctic microbiology. 2. Study of anaerobes** [Microbiología de la Antártida. 2. Estudio de anaerobios], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.279, 9p., In Spanish with English, French and German summaries. 31 refs.

During the summer of 1979/80, a study of anaerobic microorganisms was initiated. Thirty-seven samples from materials of diverse origins were studied. Anaerobic germs accompanied always by aerobic flora were isolated. The species found were *Clostridium perfringens,* in high proportion, *C. bifermentans* and *C. sordelli* in a more reduced number, *C. novy A* and *Bacteroide frágilis sub-frágilis* were isolated species not mentioned before in Antarctic literature. The occurrence of only one anaerobic species per sample, including soil sampling, is pointed out. (Auth.)

B-29143

Ramirez, F.C., Viñas, M.D., **Analysis of plankton organisms on *Orcadas 05-75*** [Analisis de organismos planctónicos de la campaña *Orcadas 05-75*], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.280, 22p., In Spanish with English, French and German summaries. 28 refs.

Presented are results of taxonomic studies of organisms carried out in the neighborhood of South Georgia and South Sandwich Islands. The species found were: the Chaetognatha *Eukrohnia hamata, Eukrohnia fowleri, Eukrohnia bathyantarctica, Sagitta gazellae, Sagitta marri* and *Sagitta maxima;* the Polychaeta *Pelagobia longicirrata, Typhloscolex muelleri, Tomopteris septentrionalis, Tomopteris planctonis, Tomopteris carpenteri, Travisiopsis levinseni* and *Krohnia bongraini;* the Amphipoda *Primno macropa, Parathemisto gaudichaudii, Hyperiella dilatata, Hyperiella macronyx, Hyperoche medusarum, Scina borealis* and *Scina antarctica;* the Pteropoda *Euclio sulcata, Limacina retroversa, Limacina helicina, Spongiobranchaea australis* and *Clione antarctica.* For the different species found in horizontal and vertical filterings totalling 114 samples, tables and maps on the quantitative distribution are included. (Auth.)

B-29146

Kubota, K., Kobayashi, A., Yamanishi, T., **Comparison of the composition of sulfur containing compounds in the odors of cooked *E. superba* (antarctic krill) and *S. lucens* (sakura-ebi),** *Agricultural Chemical Society of Japan. Journal (Nippon nogeikagaku kaishi),* 1982 56(11), p.1049-1052, In Japanese with English summary. 5 refs.

Three trithiolanes, one dithiin, one thiazole and three thialdines were identified by gas chromatography with FPD in the two tested species. These compounds were found in precooked *E. superba,* but their compositions differed quantitatively in the cooked samples. *Sergia lucens* had much less heterocyclic compounds with ethyl substituent than *E. superba.* This tendency was most remarkable among thialdine derivatives. Ethyl thialdines are formed by condensation of ammonia, hydrogen sulfide and aldehydes containing propanal. Propanal was scarcely found in *S. lucens* by TLC, and this explains the difference in the amounts of ethyl substituted sulfur compounds between *E. superba* and *S. lucens* and seemed to characterize their respective cooked odor. (Auth.)

B-29147

Ross, R.M., Quetin, L.B., **Spawning frequency and fecundity of the Antarctic krill *Euphausia superba*,** *Marine biology,* 1983 77(3), p.201-205, 16 refs.

The spawning frequency of *Euphausia superba* was estimated from observations of egg production by live individual females in captivity on board ship. The females were collected during the a tral summer of 1982 near the South Shetland Islands and Eleph Island. On the average, 15.6% of the females spawned each which indicates an interval between spawnings of 6.7 d. This dence contradicts earlier descriptions of the spawning behavior o *superba.* The females appear to be continually producing eggs releasing them periodically over the entire spawning season, and t have much higher fecundities than previously estimated. (Aut

B-29150

Adams, N.J., Brown, C.R., **Diving depths of the Gentoo penguin *(Pygoscelis papua)*,** *Condor,* Nov. 1983 85(4), p.503-504, 11 refs.

Depth gauges attached to leather harnesses are described in de in this study of diving depths of twenty-five fitted, released, recaptured Gentoo Penguins. Maximum diving depths recor ranged from 3.5 m to 70.0 m, the median depth being 9.0 m. suggested that depths of 3.5-20 m represent the normal fora depths for the Gentoo Penguin at Marion Island, where fish and occur within that diving range.

B-29153

Medina, F., Fourcade, N.H., Valle, R.A. del, **Fauna of Upper Jurassic age at Ameghino refuge and El Manco hill, Antarctic Peninsula** [La fauna del Jurásico superior del refugio Ameghino y cerro El Manco, peninsula Antártica], *Buenos Aires. Instituto Antártico Argentino Contribución,* 1983 No.293, 18p., In Spanish with Englis French and German summaries. 23 refs.

The fauna of Upper Jurassic age found in the Sobral Peninsula Ameghino refuge is described. The presence of *Inoceramus haa Inoceramus cf subhaasti, Malayomaorica malayomaorica, Taramel eras (M) cf. rigidum* and *Perisphinctes (O)* sp. permits to refer Ame ino Formation to the middle-lower Kimeridgian age. (Auth.)

B-29154

Medina, F.A., Valle, R.A. del, **New Cretaceous asteroide from Vicecomodoro Marambio Island** [Un nuevo asteroideo cretacico de la isla Vicecomodoro Marambio], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.286, 7p., In Spanish with English, French and German summaries. 10 refs.

A new species of starfish, *Cladaster carrioni* of the genus Goni teridae, found in Campanian sediments of Vicecomodoro Maram Island, is described.

B-29155

Ferrario, M.E., Ferreyra, G., **Teratology and polymorphis in antarctic diatoms and those of Argentine continental and marine environments** [Casos teratológicos y de polimorfismo observados en Diatomeas antárticas y otros abientes continentales y marinos de Argentina], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 19 No.290, 10p., In Spanish with English, French and Germ summaries. 33 refs.

Six genera, eight species and two varieties included within subclasses centricae and pennatae, are analyzed in this paper. All them, with the exception of *Biddulphia litigiosa* Van Heurck, t presents polymorphism, are characterized by teratological structu *Ceratoneis arcus* var. *amphioxys* (Rab.) Brun and *Epithemia-so* Kützing come from continental environments, the others are mari (Auth.)

B-29157
Ferreyra, G., Ferrario, M.E., **Systemic and autoecological observations of antarctic diatoms. 1.—*Coscinodiscus asteromphalus* Ehr.** [Observaciones sistemáticas y autoecológicas sobre Diatomeas Antárticas. 1.—*Coscinodiscus asteromphalus* Ehr.], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.297, 20p., In Spanish with English, French and German summaries. 41 refs.

The species *Coscinodiscus asteromphalus* Ehr. was studied from a clone isolated in Antarctica. The presence of two central processes placed in the internal side of the valve was revealed by sweeping electronic microscopy. Experimental data about the velocity of growth at four different light intensities and temperatures were obtained, a greater dependence of growth being determined in relation to the second variable. The pigmentary composition was analyzed. Geographic distribution of the species for the Southern Hemisphere is given. (Auth.)

B-29158
Ferreyra, G., Ferrario, M.E., **Seasonal morphological variation of *Rhizosolenia alata* Brightwell at Paradise Harbor, West Antarctica** [Variación morfológica estacional de *Rhizosolenia alata* Brightwell en bahía Paraíso, Antártida Occidental], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.300, 18p., In Spanish with English, French and German summaries. 21 refs.

A study was carried out by optical and electron microscopy of the seasonal morphological variation of population samples of *Rhizosolenia alata, Rh. inermis* and their respective subspecies. The variation of size and shape of the processes and ultrastructure was studied, supplemented by environmental data (light and temperature) and biological data (biomass pigments throughout the year) taken during 1976 and at the beginning of 1977. The concept of "phase" (Hendey 1937) is applied to define that variation, analyzing the incidence of the shape and size on the sinking rate of these organisms. It is established that the same is intraspecific and, therefore, both names are synonyms and the species must be recognized as *Rhizosolenia alata* Brightwell. (Auth.)

B-29159
Paggi, J.C., **Limnological studies on Potter Peninsula, South Shetland Islands, Antarctica: morphology and taxonomy of *Pseudoboeckella poppei* Mrazek 1901 (Crustacea: Copepoda)** [Estudios limnológicos en península Potter, isla 25 de Mayo (Shetland del Sur, Antártida): morfologia y taxonomía de *Pseudoboeckella poppei* Mrazek 1901 (Crustacea: Copepoda)], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.303, 34p., In Spanish with English, French and German summaries. 20 refs.

The study, carried out on a large lot of samples showed the frequent and abundant presence of only one species of copepods, identified as *Pseudoboeckella poppei* Mrazek 1901. Morphological and biometric variabilities of the species are described. (Auth.)

B-29160
SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Meeting of the SCAR Group of Specialists on Seals,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1983 No.35, 41p., 34 refs.

Reviewed are biological studies on antarctic seals regarding 1) estimation of population size, 2) growth, 3) reproduction, 4) population dynamics, 5) qualitative and quantitative food consumption, and 6) feeding behavior. Future research in the six areas is outlined, and priorities include determination of why elephant seal populations are declining, pelagic work on fur seals during lactation, studies on the feeding ecology of pack ice seals, and development of satellite tracking capability for all seals. Reports by various countries of returns made under the different conservation-of-antarctic-seals agreements are reviewed, as is the status of antarctic seal stock. The topic of pinnipeds as indicator species, and their usefulness in monitoring studies, is discussed. Questions related to the above topic are answered. A BIOMASS database is proposed, and the group offers to make raw seal data available to it. Ten appendices are included, four of which represent seal population estimates and two are summary returns of seals killed. Appendix 9 is a map of residual pack ice areas presumed to constitute population centers for pelagic antarctic seals. Appendix 10 is a proposal to UNEP/FAO/IUCN under the Global Plan of Action for Marine Mammals.

B-29164
Plötz, J., **Biological development and ecology of parasites on seals and sea birds** [Entwicklungsbiologie und Ökologie der Parasiten von Robben und Seevögeln], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.27-29, In German.

The research was concerned primarily with the host succession biology of marine parasites, mainly nematode larvae. Specimens of Weddell, crabeater, and fur seals, Adélie and emperor penguins, southern skua, several varieties of petrel, and other sea birds were examined. Most of the internal organs of these specimens were infested; however, in seals, the heart, liver, and lungs were not. In birds, several varieties of the parasite larvae thrived.

B-29180
Abyzov, S.S., Filippova, S.N., Kuznetsov, V.D., ***Nocardiopsis antarcticus*--a new species of actinomyces, isolated from a central antarctic glacier** [*Nocardiopsis antarcticus*--novyĭ vid aktinomitseta, vydelennyĭ iz tolshchi lednika Tsentral'noĭ Antarktiki], *Akademiia nauk SSSR. Izvestiia. Seriia biologicheskaia,* Jul.-Aug. 1983 No.4, p.559-568, In Russian with English summary. 46 refs.

Microbiological analysis of an ice core 320 m long, taken from a central antarctic glacier, revealed different microorganisms, conserved under anabiosis for a long time. Among the isolated forms, the actinomyces were found to be rarely distributed in comparison with the other groups of microorganisms. A new species of actinomyces, named *Nocardiopsis antarcticus,* is described. It differs from the other species of this genus by its ability to synthesize melanoid pigment resulting in melanogenesis. (Auth.)

B-29181
SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Report of the 1982 meeting of the Group of Specialists, Nikko, Japan, 31 May—4 June 1982,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Sep. 1982 No.24, 63p. + appends.

The group met to review the activities of BIOMASS working parties and technical and ad hoc groups. The FIBEX Project, which included collection of data—acoustic, oceanographic, biological, and on predators—, and the BIOMASS and SIBEX objectives were also reviewed. SIBEX implementation, and joint proposal by Australia, France, Japan and South Africa are discussed, as are the relationship between BIOMASS and CCAMLR, future BIOMASS coordination structure, workshops, publications, secretariat and budget. Environmental implications of possible mineral exploration and exploitation in Antarctica are stressed and various recommendations made, with special emphasis on BIOMASS data management-and-analysis plans.

B-29182

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Data, statistics and resource evaluation, Tokyo, Japan, May 1982,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.25, 16p. + appends.

The group reviewed information generated by FIBEX, commercial fishing and other activities to assess the volume, quality and appropriateness of this information in relation to the objectives of the BIOMASS program. Management and analysis of data within the BIOMASS program are discussed, and six possible locations of the BIOMASS database are considered. Guidelines for the BIOMASS Data Center are outlined; recommendations regarding resource evaluation information from FIBEX, and resource evaluation objectives and requirements of SIBEX, are presented. Recommendations indicating how methods of collecting data in BIOMASS may be improved, and those which deal with the need to extend data collection into important problem areas which have not yet been addressed by BIOMASS, are listed in an appendix.

B-29183

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Working Party on Fish Biology. Report of Second Workshop on the Aging of Antarctic Fishes,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.26, 4p. + appends.

Prepared papers on fish physiology, morphology and research methods were presented, and a discussion concerning publication followed. Laboratory work consisted of examining scales, otoliths, and other material. The species [illegible] *Dissostichus* were identified as presenting the most difficult problem in age determination because of their longevity and slow growth. Several recommendations were made, including those stressing the need for better participation in future workshops, especially by Russian, Polish, and East German workers because of the probable wealth of their information on the subject. The period August-September is suggested as the best for future meetings.

B-29184

SCAR/SCOR/IABO/ACMRR Working Party on Bird Ecology, **Report of Meeting of BIOMASS working Party on Bird Ecology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.27, 16p. + annex 1-3.

The need for a manual of methods and techniques used in monitoring antarctic and subantarctic seabirds, in general, and that of a guide to techniques available for surveying penguin colonies, in particular, was acknowledged and the guide outlined. Compilation of weight data for antarctic and subantarctic seabirds, and their bibliographies, were recommended, as was a handbook of identification of fish remains in predator stomachs. A central data bank for coordination of antarctic bird banding, and an inventory of color-banding projects, were proposed. Field work was reviewed in a country-by-country breakdown. Other recommendations were that a workshop for the analysis of Southern Ocean pelagic seabird data be planned for 1985, and that a part of SIBEX operations be devoted to an assessment of krill distribution and abundance within the foraging range of major penguin concentrations.

B-29185

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Meeting of Working Party on Fish Ecology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.28, 24p. + annex 1-2.

Participants summarized the icthyological research from their respective countries. It was agreed that the results from these investigations should be combined and analyzed by scientists from Argentina, Chile, Federal Rep. of Germany, France, Japan, Poland, UK, USA and USSR. The following objectives of future research were agreed upon: to evaluate the role of fish within the antarctic ecosystem, especially in terms of their relationship with krill; to improve the knowledge of the biology of antarctic fish species; to assess the status of major fish stocks under fisheries exploitation and the impact of krill fisheries on fish stock recruitment. Recommendations included suggestions regarding fishing equipment and its use; proposals for a standardized data format for fish and and ichthyoplankton investigations; time and place for the next two meetings; production of a Handbook for the identification of remains of antarctic and subantarctic fish in the stomachs of their predators; and publication of an antarctic larval fish atlas.

B-29190

SCAR/SCOR/IABO/ACMRR BIOMASS Technical Group on Programme Implementation and Coordination, **Technical Group on Programme Implementation and Coordination. Third Meeting.,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.29, 28p. + annex 1-3.

The group worked on the implementation of BIOMASS in relation to the needs of the Convention on Antarctic Marine Living Resources. It reviewed past scientific planning for SIBEX on which to decide what could be undertaken in terms of ships time, facilities, manpower and financial resources. Four recommendations followed; the guiding principles of scientific objectives and program for SIBEX were outlined. The accepted objectives included studies on krill—abundance and distribution, production, stock, reproduction—fish recruitment in relation to krill fisheries, fish ecology in SIBEX areas, and predator stocks and trophodynamics. A representative for each country present indicated which of the SIBEX objectives could be addressed by which vessels and in which seasons. Design of SIBEX for the different investigational areas followed. Further preparatory work for SIBEX, and action for evaluation of FIBEX, SIBEX and other BIOMASS activities, were outlined. The question of formats for all suitable data to be collected in SIBEX was debated. The group recognized the major data types concerned as acoustics, krill, oceanography, fish, birds, phyto- and zooplankton, whales and seals.

B-29204

Smith, H.G., Headland, R.K., **Population ecology of soil testate rhizopods on the subantarctic island of South Georgia,** *Revue d'écologie et de biologie du sol,* 1983 20(2), p.269-286, With French summary. 27 refs.

The abundant species at the sites with the more acid soils and peats (pH 3.9-4.2) were *Phryganella acropodia, Assulina muscorum* and *Corythion dubium.* The fauna of the less acid soils (pH 4.6-5.6) were dominated by *Centropyxis aerophila* and *Centropyxis aculeata* as well as *P. acropodia.* The populations of 18 species of testate rhizopod, at four sites with contrasting vegetation and soil types on the subantarctic island of South Georgia, were determined at monthly intervals from November 1978 to January 1980. Similarities to the testate fauna of soils and peats on maritime Antarctic and other subantarctic islands were evident and limited comparisons to those of *Sphagnum* bog, Alpine meadow and Lowland woodland soils in the northern hemisphere could also be drawn. Fluctuations in the testate populations did not show any consistent seasonality, but all the abundant species underwent population blooms during the spring months, when relative growth rates exceeding 5.0%/day were evident. (Auth.)

B-29205

Jörgensen, P.M., **Distribution patterns of lichens in the Pacific Region,** *Australian journal of botany,* Sept. 1983 Suppl.No.10, p.43-66, Refs. p.64-66.

The distribution patterns of lichens in the entire Pacific region from the Arctic through the Americas, East Asia, Australia and New Zealand to Antarctica are reviewed. Several distinct distribution patterns are found: some of the major geological events of the region are reflected in them. It is obvious, however, that long-distance dispersal also plays an important role in the distribution of lichens. The part of Antarctica bordering the southern Pacific region is the poorest in lichens. It appears to be quite different from western Antarctica, and some of the species described from there may be endemic. However, the taxonomy of Antarctic lichens is still very little known, in spite of the existence of a lichen flora. Recent studies on some genera have shown that surprisingly many species, occur in both Antarctica and the Arctic. Probably as much as 25% of the Antarctic lichen flora may belong to a bipolar element. The similarity at the generic level is even more striking. This is the best argument for a Pangean origin of many bipolar genera but it certainly does not prove that all bipolar taxa had such an origin. (Auth.)

B-29206

Hunter, S., **Interspecific breeding in giant petrels at South Georgia,** *Emu,* 1982 82(Suppl.), p.312-314, 14 refs.

A three-seasons study of 1,500-1,800 pairs of giant petrels showed that favorable food conditions and lack of predation of chicks at Bird Island are responsible for the success of interspecific pairs in rearing chicks at a time intermediate between the breeding seasons of *M. giganteus* and *M. halli.*

B-29207

Doucette, G.J., Fryxell, G.A., ***Thalassiosira antarctica:* vegetative and resting stage chemical composition of an ice-related marine diatom,** *Marine biology,* 1983 78(1), p.1-6, 24 refs.

Comparative investigation of the chemical composition of *Thalassiosira antarctica* var. *antarctica* vegetative and resting stages revealed C:N and C:chl *a* ratios to be lower in vegetative cells. These trends primarily reflect vegetative levels of C/cell below, and N/cell and chl *a* cell levels above those of spores. There was a change in chemical composition with the initial formation of resting spores, and spores continued to modify their composition while maintained in a cyclic light/dark regime for about one and one half weeks. Most notable was a net increase in carbon and chlorophyll *a* per cell. Spores then subjected to darkness for over one week appeared to retain most of the carbon and chlorophyll *a* previously synthesized. These findings support the idea that resting spores enhance the survival capabilities of a species under adverse conditions. (Auth.)

B-29213

Thomas, J.A., DeMaster, D.P., **Parameters affecting survival of Weddell seal pups *(Leptonychotes weddelli)* to weaning,** *Canadian journal of zoology,* 1983 61(9), p.2078-2083, With french summary. 10 refs.

Birth dates, onset and duration of molt, spacing of females and pups, onset and date of weaning, and post-weaning dispersal of Weddell seal pups *(Leptonychotes weddelli)* in breeding colonies from 1976 to 1979 were examined. Survival of pups to weaning is most influenced by their date of birth, their ability at a very young age to haul out on the ice, and the stability of the fast ice during their weaning. The onset and duration of molt is variable; neither a long molt nor an early molt adversely affects pups. Pups born late in the season are not weaned at a younger age. Exclusive space for females and pups in the colony is most important immediately after a pup's birth. Pups born during the optimal pupping period and in years of stable fast ice share a high probability of survival. (Auth.)

B-29214

Thomas, J.A., DeMaster, D.P., **Diel haul-out patterns of Weddell seal *(Leptonychotes weddelli)* females and their pups,** *Canadian journal of zoology,* 1983 61(9), p.2084-2086, With French summary. 8 refs.

Radio-frequency transmitters were used to determine the diel haul-out pattern of Weddell seal *(Leptonychotes weddelli)* females and their pups during the breeding season in McMurdo Sound. Individual and seasonal variations in haul out are reported. There is no significant difference in the haul-out patterns among parous females or among pups. Females spend increasingly more time in the water as weaning of their pups commences. About 6 weeks after parturition, females haul out for significantly shorter periods, which probably indicates the onset of mating. (Auth.)

B-29215

Thomas, J.A., Stirling, I., **Geographic variation in the underwater vocalizations of Weddell seals *(Leptonychotes weddelli)* from Palmer Peninsula and McMurdo Sound, Antarctica,** *Canadian journal of zoology,* 1983 61(10), p.2203-2212, With French summary. 17 refs.

The Weddell seal *(Leptonychotes weddelli)* is one of the most vocal pinnipeds. The repertoires of subice vocalizations of Weddell seals recorded at Palmer Peninsula and at McMurdo Sound are different. Although seals at both sites give some of the same vocalizations, there are subtle spectral and temporal differences. In addition each population has unique vocalizations which are not heard at the other site. At Palmer Peninsula, there are several usage characteristics not exhibited at McMurdo Sound, such as mirror-image vocalization pairs and vocalization trios. Weddell seals in McMurdo Sound make extensive use of nine auxiliary sounds, while the Peninsula repertoire has none. Factors which appear to have been important in the development of these geographic differences appear to include strong fidelity to breeding sites, a polygynous mating system, and learning. Geographically different vocal repertoires have potential for identifying discrete breeding stocks of Antarctic seals. (Auth.)

B-29222

Schreiweis, D.O., **Comparative study of the appendicular musculature of penguins (Aves: Sphenisciformes),** *Smithsonian contributions to zoology,* 1982 No.341, 46p., 25 refs.

DLC QL1.S54 no.341

The gross anatomy of all the appendicular muscles is compared in 14 species, representing the 6 living genera of Sphenisciformes. Particular emphasis is placed on the interrelationships indicated by variations in the taxa. *Eudyptes pachyrhynchus* is used as a type for which all the appendicular muscles are described and most are illustrated. The salient features of other taxa, as they differ from the condition found in *E. pachyrhynchus,* are given. Similarities and differences are compared quantitatively in respect to 47 items in the wing and 41 in the leg. The results are given in the form of cumulative scores of differences and correlation coefficients. The results of the comparison of the wing musculature support those for the leg. The cumulative scores and correlation coefficients give closely parallel results. The Sphenisciformes constitute a rather uniform group of birds. The results of this study support the present classification of the order, in which 14 species are grouped into 6 genera. A tentative phylogeny of penguins is projected on the basis of variations in the wing and leg muscles. (Auth.)

B-29225

Berzin, A.A., Vladimirov, V.L., **New species of killer whale from the Antarctic** [Novyĭ vid kosatok iz Antarktiki], *Priroda,* 1982 No.6, p.31, In Russian.

Investigations carried out by a group of scientists as part of the whaling fleet *Sovetskaia Rossiia* are reported. In the Antarctic, the killer whale is seldom seen alone. The "yellow" variety—so called because its entire body is covered with diatoms—travels in groups of 150 to 200 individuals and keeps, with rare exception, within coarse pack-ice floes, while the "white", or ordinary variety, usually prefers clear waters and travels in groups of only 10 to 15 individuals. Nutritional, morphological and ecological characteristics of the *Orcinus* in the Antarctic are discussed, on which basis the name of *Orcinus glacialis* is proposed.

B-29242

Averintsev, V.G., **Seasonal changes in the sublittoral polychaetous fauna *(Polychaeta)* of the Davis Sea** [Sezonnye izmeneniia v sublitoral'noĭ faune mnogoshchetinkovykh cherveĭ *(Polychaeta)* moria Deĭvisa], *Akademiia nauk SSSR. Zoologicheskiĭ institut. Issledovaniia fauny moreĭ,* 1982 28(36), Ekologiia i sistematika morskikh gidrobiontov (Ecology and systematics of marine hydrobionts) edited by O.A. Skarlato, p.4-70, In Russian with English summary. Refs. p.67-70.

Seasonal changes of polychaetous worms in shallow waters of the Davis Sea, determined by using the diving quantitative principle throughout the year, are reported. Five taxocenes are distinguished on the basis of biomass data, metabolic expenditures, and change of the specific composition. The borders of the taxocenes coincide well with the borders of the biocenoses. Data on seasonal dynamics of bioenergetically significant indices, vertical distribution, age, the size-age structure of the population and reproduction of most species are presented and the size-weight ratios are given. The paper contains descriptions and drawings of new species. The role of various biogeographic groups in the species abundance and production of taxocene biomass is estimated. (Auth.)

B-29243

Gruzov, E.N., **Quantitative biological sample list of the 16th Soviet Antarctic Expediton** [Spisok kolichestvennykh prob 16 Sovetskoĭ antarkticheskoĭ ekspeditsii], *Akademiia nauk SSSR. Zoologicheskiĭ institut. Issledovaniia fauny moreĭ,* 1982 28(36), Ekologiia i sistematika morskikh gidrobiontov (Ecology and systematics of marine hydrobionts) edited by O.A. Skarlato, p.96-105, In Russian with English summary.

A list of quantitative biological samples, floral and faunal, collected during the 16th Soviet Antarctic Expedition in 1971-72 is presented. The samples are identified by name as well as by profiles indicating the time of the year and the water depth at which samples were collected.

B-29244

Smirnov, I.S., **Fauna of floating kelp rhizoids from the Subantarctic and the Patagonian shelf** [Fauna plavaiushchikh rizoidov makrofitov iz Subantarktiki i raĭona Patagonskogo shel'fa], *Akademiia nauk SSSR. Zoologicheskiĭ institut. Issledovaniia fauny moreĭ,* 1982 28(36), Ekologiia i sistematika morskikh gidrobiontov (Ecology and systematics of marine hydrobionts) edited by O.A. Skarlato, p.108-109, In Russian with English summary. 7 refs.

This paper contains a preliminary list of invertebrate animals found on floating rhizoids *Macrocystis pyrifera* in cold and temperate waters off South Georgia.

B-29245

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Atlas of Fish Larvae of the Southern Ocean,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS handbook,* 1983 No.22, 74p., Refs. p.71-74.

The material was collected during ten cruises of the *Akademik Knipovich.* The larvae of thirty-six species have been identified and are described and illustrated. To identify the larvae, a series of post-larvae to pre-larvae were selected for each species. The species was identified from the oldest larva in the series, with primary attention given to the meristic characteristics: the number of myotomes, vertebrae and fin rays. It is noted that in the Scotia Sea the pelagic ichthyofauna is rich, with about 50 species recorded for the region. Spawning is classified into three groups: species spawning in early winter, those spawning in early spring, and species spawning in early summer, but hatching always occurs in spring or summer. Circular or cyclonic currents in the vicinity of all the island groups around the Scotia Sea concentrate the pre-larvae and larvae in a favorable environment. When these cyclonic currents are absent, strong currents carry the larval stages away from the shelf to the open sea where their death occurs rapidly. These exceptional years cause disturbance in the recruitment of the main exploited fish population.

B-29246

SCAR/SCOR/IABO/ACMRR Working Party on Bird Ecology, **Distribution and abundance of antarctic and subantarctic penguins: a synthesis of current knowledge,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS scientific series,* 1983 No.4, 46p., 100 refs.

This paper lists eight species of penguins and provides a count at each location in Antarctica and the subantarctic islands where penguins have been found breeding. The species listed are: emperor, king, Adélie, chinstrap, gentoo, macaroni, and rockhopper. Sixteen maps show the distribution of each species in the entire area.

B-29247

Marenga, A., **South Georgia reindeer** [Le renne della South Georgia], *Il polo,* 1983 39(4), p.96-97, In Italian.

The introduction of eleven reindeer on Barff Peninsula in 1911, and that of additional seven animals released in Busen Point in 1925, is recalled. Although a glacier separates the two areas, three herds of reindeer exist currently in South Georgia, numbering a total of approximately 2,000 heads, after having peaked in 1958 at about 3,000.

B-29249

Kupina, N.I., Borodina, G.I., **Technological characteristics and potential utilization of antarctic fish** [Tekhnokhimicheskaia kharakteristika i vozmozhnosti ispol'zovaniia ryb Antarktiki], *Rybnoe khoziaĭstvo,* 1982 No.12, p.54-58, In Russian.

Properties of trematoma, ice fish, and other antarctic fresh fish are studied, including their dimensions, weight, chemical composition and dynamics of salting and storage. At temperatures 7-9 C the fish can be stored from 4 to 37 hours without risk of radical biochemical processes taking place. Recommendations for utilization of the different types of fish for production of different foods are included.

B-29251

SCAR/SCOR/IABO/ACMRR Group of Specialists on Living Resources of the Southern Oceans. Working Party on Krill Abundance, **Report of the third meeting,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1980 No.11, 37p.

Status reports of investigations carried out by Chile, France, Japan, Poland, South Africa, UK and USSR are given. Proposed FIBEX acoustic surveys are reviewed in terms of the need for: 1) a widely spaced coverage of the krill low-density area of the Scotia Sea and 2) more intensive studies to determine the broad distribution of krill over a wide area. The objectives of the acoustic work cover the definition of low and high abundance areas, testing and improvement of the methodology employed and expanding knowledge of krill behavior. Participating countries are Australia, France, Japan and South Africa. Two survey proposals with five and four vessels, respectively, are presented. A survey design, with considerations regarding possible modifications, is outlined. Recommendations cover appointments of additional technical experts to the group, problems resulting from overlapping responsibilities, data management, requests for additional countries to participate with ships in the FIBEX, and allocation of funds. There are two appendixes. The first presents 17 tabled documents concerning krill abundance; the second is a cruise report of SA Agulhas' twelfth voyage in antarctic waters between February 28 and April 2, 1980, covering mainly equipment performance and scientific findings.

B-29252

SCAR/SCOR/IABO/ACMRR Working Party on Fish Biology in the Southern Ocean, **Preliminary assessment of stocks of selected antarctic fish species. Second meeting,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1980 No.12, 15p. + Append., 14 refs.

Mortality estimates, based on three approaches—catch curve analysis, mean size and age, and age at first maturity—are presented for the following species: *N. rossii marmorata, N. magellanicus, C. rhinoceratus, C. gunnari, C. aceratus, P. georgianus, N. rossii rossii,* and *N. gibberifrons.* The vulnerability of these species to overfishing is calculated and recommendations regarding future research activities on fish stock assessment are put forward. Biomass data, from Polish and German trawl surveys off South Georgia, are analyzed showing a significant rate of decline in biomass of groundfish since 1975. The group concludes that, should heavy fishing continue, the fish biomass will be reduced to dangerously low levels.

B-29253

SCAR/SCOR/IABO/ACMRR Technical Group on Programme Implementation and Coordination, **BIOMASS. Draft report,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1980 No.13, 30p. + annex 1-3.

The primary objectives of FIBEX are summarized as follows: to study the methodology for assessing the abundance of the total krill population, to map the distribution of krill in the southwest Atlantic and south Indian Ocean and along two meridional sections of the south Pacific Ocean, and to obtain a synoptic assessment of the abundance of krill in the southwest Atlantic sector of the southern ocean. Representatives of 13 countries provide details concerning vessels available for participation in FIBEX 1980/81 season. Reports from Data Workshop and Working Party on Acoustic Krill Abundance Estimation in Hamburg, and Working Party on Fish Biology and FIBEX Survey Design Meeting in Dammarie-les-Lys, are presented. Proposed acoustic surveying in Scotia Sea, the Indian Ocean and FIBEX Related programs in the Pacific, stations, vessels, fishing equipment, communications and finalization of plans, are discussed. Patch-or-swarm studies, their definition, objectives, methods and examples (of past or on-going studies), are reviewed. Value and extent of Intergovernmental Oceanographic Commission's support for FIBEX, and inter-relationship policies, are discussed; three recommendations, concerning allocation of survey areas, vessels, schedules and data management, are adopted.

B-29254

SCAR/SCOR/IABO/ACMRR Group of Specialists on Living Resources of the Southern Oceans, **Report on the BIOMASS Data Workshop,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1980 No.15, 26p. + annex.

The group met to produce recommendations ensuring compatibility in the data collected during FIBEX acoustic and net surveys, to discuss problems of centralized interpretation of the data, and to make recommendations on the methods to be used. Summary of Presentations of several participants are summarized, alternating with reports of workshop sessions, covering data collection methods, data requirements for estimating krill abundance, and evaluation of a multidisciplinary database for biological investigations in FIBEX. A list of the preliminary agreements on formats for the exchange of acoustic, haul and biological data collected is presented, as is a list of recommendations to the Working Parties on krill abundance, physical and chemical oceanography, krill biology and bird biology. Included are two appendixes, a talk given on acoustic data types and a talk on standardization of the description of bioenergetic processes in *Euphausia superba* Dana, respectively.

B-29255

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Post-FIBEX Data Analysis Workshop: seabird ecology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1981 No.22, 11p. + annex 1-5.

The Working Party preparations to provide advice on the arrangements for encodement and analysis of seabird data from FIBEX, and to coordinate and evaluate the analysis of those data transmitted to the post-FIBEX Workshop, are described. Results include graphs showing the cruise tracks of vessels engaged in FIBEX and tables recording 51 species of seabirds, their distribution, diversity, abundance, biomass and standing crop in the Indian and Atlantic Oceans. Annexes 1 to 3 cover letter-forms to Chief Scientist in FIBEX and members of BIOMASS WPBE, as well as the copy of a letter to FIBEX database, with ornithological queries; annex 4 is a list of seabirds recorded south of 50 S during FIBEX operations, with body mass and principal diet; annex 5 is a collection of graphs and tables showing the distribution of FIBEX seabird records in 5 deg lat. x 15 deg long. grid in Indian and Atlantic Oceans, and all ships' activities.

B-29256

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **SIBEX Chief Scientists' Meeting,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1983 No.32, 5p.

Planned activities in 1983/84 of the various countries involved in SIBEX are reviewed in the following terms: names of ships engaged, dates of their availability, equipment to be used, seasons and areas to be covered, length and type of research to be carried out. The participating countries are: in the Atlantic sector, Argentina, Chile, Brazil, Federal Republic of Germany, Poland, UK, USSR, and USA; in the Indian sector, South Africa, Australia, France and Japan; and in the Pacific sector, Japan and China.

B-29257
SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **First Meeting of the *ad hoc* Group on Squid Biology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1983 No.33, 81p., 13 refs.

The current status of antarctic squid biology, its taxonomy, including adults and larvae, the study of cephalopods from their occurrence in predators' stomachs, and methods and techniques for assessing the squid stocks in the Antarctic are discussed. Recommendations are made with regard to what equipment to use at what location, how to carry out an acoustic survey and interpret its data, how to secure and allocate funds and what priorities to assign in biomass research. The report includes: 1) instructions for the collection and preservation of cephalopod beaks in the form of a handbook, with four appendixes and 8 references, 2) instructions for fixation and preservation of squids, 3) instructions for dealing with squids and octopuses found floating on the sea, and 4) instructions for the disposition and utilization of cephalopod material.

B-29258
SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Meeting of BIOMASS Working Party on Bird Ecology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1983 No.34, 33p.

The group reaffirmed the desirability of compiling a manual of methods and techniques used in counting and monitoring antarctic seabirds set out in BIOMASS report series No. 27. Decision is made regarding the scope, contents and schedule of the manual. Compilation of mass data for antarctic and sub-antarctic seabirds, including data sources, format and publication, is discussed. The penguin data are updated to December 1982 and a handbook on identification of fish remains in predator stomachs is outlined. The progress report "Central data Bank for coordination of antarctic bird banding" is reviewed, and an inventory of color-banding projects is proposed. A proposal to evaluate the use of remote sensing in antarctic bird studies is accepted. A proposal to evaluate the use of remote sensing in antarctic bird studies is accepted. Past achievements and future prospects are reported by various countries. The ornithological research during SIBEX is discussed. The various steps necessary to effectively analyze the FIBEX seabird data are explored. A summary of twelve recommendations is included. Annexes 1-3 contain a list of 14 tabled papers, response to questions submitted by the Scientific Committee of the Commission for the Conservation of Antarctic Marine Living Resources, and requirements for the analysis of FIBEX seabird data, respectively.

B-29284
Stott, F.C., **Notes on the biology of the Patagonian hake, *Merluccius hubbsi* (Marini), the southern blue whiting, *Micromesistius australis* (Norman) and others in the Falkland Islands shelf area,** *Journal of fish biology,* Dec. 1982 21(6), p.705-714, 4 refs.

From the examination of samples of fish caught in two commercial surveys on trawling grounds around the Falkland Islands, it is noted that Patagonian hake, *Merluccius hubbsi,* southern blue whiting, *Micromesistius australis,* and others occurred in fishable quantities especially to the east of Beauchene Islands where fishes were larger and more numerous. However, 47% of the total catch consisted of southern blue whiting which was 100% infested by a myxosporidian parasite in its musculature rendering it unsuitable for human consumption. (Auth.)

B-29287
Piatkowski, U., Klages, N., **German Antarctic Expedition 1980/81 with FRV *Walther Herwig* and RV *Meteor,* Firs International BIOMASS experiment (FIBEX): Data of micronekton and zooplankton hauls,** *Bremerhaven, Germany. Alfred-Wagener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 No.15, 59p., In English with German summary. 22 refs.

This report presents the plankton haul data collected during th German Antarctic Expediton 1980/81 with FRV *Walther Herwig* an RV *Meteor.* Most of the hauls were taken in conjunction with th First International BIOMASS Experiment (FIBEX). The report i intended to serve as a source of information for the evaluation o preserved plankton material. (Auth.)

B-29289
Malmgren, B.A., **Ranking of dissolution susceptibility of planktonic foraminifera at high latitudes of the South Atlantic Ocean,** *Marine micropaleontology,* Dec. 1983 8(3), p.183-191, 17 refs.

Surface-sediment samples from the Maurice Ewing Bank, Sout Atlantic Ocean, have been analyzed to rank dissolution susceptibilit of cool water planktonic foraminiferal species. A dissolution inde is formulated from quantitative analyses of sedimentological properties (CaCO3 content, frequency of planktonic foraminiferal fragments, radiolarians, mineral grains, and ratio of a dissolution-toleran to a dissolution-susceptible planktonic foraminiferal species). Thi index is used to assess degrees of dissolution in the samples. Quantified differences in relative abundance of species between the tw dissolution regimes (less prominent and stronger dissolution) forme the basis for differentiation. The species were ranked in the followin order, from most resistant to least resistant: sinistrally coiled variet of *Neogloboquadrina pachyderma* (antarctic variety of this species) *Globorotalia inflata, G. truncatulinoides, Globigerina bulloides* an *Globigerinita glutinata* (a tie), dextral *N. pachyderma* (subantarcti variety), *Globigerinita uvula,* and *Globigerina quinqueloba.* (Auth mod.)

B-29298
Cárdenas, J.C., Jáñez, J., **Imperfect albinism in *Arctocephalus gazella* (Peters, 1875) on South Shetland Islands** [Variaciones extremas de color del Lobo Fino Antártico *Arctocephalus gazella* (Peters, 1875) en Islas Shetland del Sur, Chile], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.5-12, I Spanish with English summary. 10 refs.

Three cases of imperfect albinism in juvenile males of *Arctocephalus gazella* were found in the antarctic fur seal population studie during the breeding season of 1981-1982 on Livingston and Kin George Islands. Imperfect albinism incidence in total population o juveniles counted is 1:138. A table of summarized observations is included.

B-29299
Zamorano, J.H., **Zonation and biomass of the benthic macrofauna of South Bay, Palmer Archipelago, Antarctica** [Zonación y biomasa de la macrofauna bentónica en Bahía South, Archipiélago de Palmer, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.27-38, In Spanish with English summary. 19 refs.

It is known that ice is the main factor responsible for the benthi zonation patterns in the antarctic coastal shallow waters. This pape shows the influence of ice on the zonation of macrobenthic sublittora communities to depths of 30 m. in South Bay. Macrobenthos wa studied and sampled by means of scuba diving along three transects of different orientation within the bay. At each transect, three samples of 0.1 sq. m. each were taken at every five meters of depth, and species composition and biomass (alcohol weight) were determined according to the depth gradient for all the transects. The biomass and species richness increase with depth, being more accentuated on steep slopes. According to the dominant organisms, type and topography of the bottom, four zones are identified; of those, three have similar slopes, biomass values and species richness. A zone of soft bottoms located between 15 and 20 m depth, with a gentle slope, presents strong variations in the number of individuals and species, and great fluctuations in biomass values among the transects, varying between 7.79 and 7.690 gr/sq. m. The relationship between local variations and the magnitude of of the bottom slope, and the degree of exposure of the bottoms to the abrasive action of floating icebergs within the bay, resulting in a clear zonation pattern of the communities, is suggested. (Auth.)

B-29304

Sallaberry, M., Schlatter, R., **Estimate of the number of penguins on the South Shetland Islands** [Estimación del número de pingüinos en el Archipiélago de las Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.87-91, In Spanish. 6 refs.

In November and December 1981, during the 36th Chilean Antarctic Expedition, 10 islands of the South Shetland archipelago were photographed from a helicopter. The population of breeding penguin colonies was estimated from the resulting photographs. No penguin colonies were identified on the islands Dee, Window and Rugged.

B-29305

Valencia, J., Sallaberry, M., **Penguin census on Ardley Island (South Shetland Islands)** [Censo de pingüinos en isla Ardley (Shetland del Sur)], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.93-96, In Spanish. 6 refs.

An exact count of three species of penguins—*Pygoscelis antarctica, P. papua* and *P. adeliae* was carried out on Ardley Island in January 1983. The group distribution is recorded on a topographic map of the island.

B-29306

Etcheverry D., H., **Benthic algae of the Chilean Antarctic** [Algas bentónicas de la Antártica Chilena], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.97-124, In Spanish with English summary. Refs. p.122-124.

This study is based on a considerable amount of algological material collected during different Chilean expeditions to the Antarctic in the years 1947 to 1981, and by some scuba-diving investigations carried out from 1957 to 1962. The principal diving took place at Coppermine Cove (Robert Island). Benthic antarctic algae, including the *Chlorophyta, Phaeophyta* and *Rhodophyta* are revised, and phenological and ecological information, as well as the distribution of vegetation, are provided. A limiting factor in the distribution of the macroscopic vegetation is the mechanical influence of ice. The littoral flora is poorly developed and limited to open spaces and tide pools. The sublittoral flora presents a predominance of *Phaeophyta* with the genera *Desmarestia, Ascoseira, Cystophaera, Phaerus* and *Himantothallus.* The *Rhodophyta* are represented by the genera *Plocamium, Myriogramme, Iridaea, Leptosomia,* etc. The sublittoral species were found to reach down to depths of 20 m. (Auth.)

B-29312

Tanner, A.C., Herbert, R.A., **Numerical taxonomic study of gram-negative bacteria isolated from the Antarctic marine environment,** *Centre National pour l'Exploitation des Océans. Actes de colloques,* 1982 No.13, Colloque de microbiologie, 2nd, Marseille, June 24-25, 1981, p.31-38, With French summary. 19 refs.

One hundred forty-four gram-negative bacteria, indigenous to the maritime antarctic environment, together with six reference strains, were examined for ninety four unit characters, including morphology, production of exoenzymes, growth temperature characteristics and ability to utilize various organic carbon sources. The resulting data were analyzed using the S sub(SM) and S sub(J) similarity coefficients with the UPGMA algorithm. At a 70% level of similarity, 97% of the isolates were included in ten clusters. Fifty percent of the isolates were identified as belonging to the genera Aeromonas/Vibrio; 22%, Alcaligenes; 2%, Pseudomonas; and 2% Flavobacterium. The remainder could not easily be identified with bacteria previously described in the Eighth edition of Bergey's Manual of Determinative Bacteriology. Whilst some of these isolates resembled a proposed new species, *Vibrio fluvialis* sp.nov., others may well represent previously undescribed bacteria. (Auth.)

B-29314

Cannon, R.J.C., **Experimental studies on supercooling in two antarctic micro-arthropods,** *Journal of insect physiology,* 1983 29(8), p.617-624, 15 refs.

Samples of mites and Collembola which had been acclimated at 5 C and provided with natural foods were cooled at four constant cooling rates and their individual supercooling points measured. Frequency distributions of supercooling points comprised not less than 84 *(Alaskozetes antarcticus)* and 96 *(Cryptopygus antarcticus)* individuals in each case. Two modal groups were displayed in these distributions, which were widely separated in temperature and termed low group and high group. In *(Alaskozetes* a trough between -3 and -4 C was present in the high group distribution. In Cryptopygus, the high groups were narrow and peaked at all cooling rates. (Auth.)

B-29315

Williams, R., **Inshore fishes of Heard and McDonald Islands, Southern Indian Ocean,** *Journal of fish biology,* Sept.1983 23(3), p.283-292, 19 refs.

Nine species of fishes are recorded from the inshore waters of Heard and McDonald Islands. These records confirm the affinities of the fish fauna of these islands to that found at the neighboring Kerguelen Islands, 380 km to the north-west on the same submarine plateau. Data on the stomach contents and gonad states of *Notothenia coriiceps coriiceps, N. rossii rossii* and *Channichthys rhinoceratus* show some differences from the same or related subspecies at other localities. *Notothenia c. coriiceps* shows more affinities in feeding and reproduction to *N. c. neglecta* from Terre Adelie, Antarctica, than to those from the Scotia Sea, in having a significant proportion of active benthic and benthoplanktonic invertebrates in its diet, in spawning in mid-summer and in having a low relative gonad size. *Channichthys rhinoceratus* has a slightly more diverse diet and its spawning season is later than in the same species at Kerguelen Islands. (Auth.)

B-29318

U.S. Marine Mammal Commission, **Annual report of the Marine Mammal Commission, calendar year 1983: a report to Congress,** Washington, D.C., 1984, 118p., Includes bibliographies of Commission-sponsored reports: p.99-118.

The report lists the following activities concerning Antarctica: the development of a long-range plan to detect and monitor the possible effects of krill harvest on whales, seals, and other components of the antarctic marine ecosystem, now in progress; other activities related to the protection and conservation of antarctic marine living resources, which took place at the 1983 Antarctic Commission and the Scientific Committee Meetings, discussions focusing on three general topics: information and data requirements, research requirements, and management goals; preparations for 1984 meetings; implementing legislation; activities related to non-living resources. Reviewed is also the Commission's participation in the July 1983 meeting of the International Whaling Commission, with discussions concerning the cessation of commercial whaling and related activities.

B-29319

Cairns, S.D., **Antarctic and subantarctic Stylasterina (Coelenterata: Hydrozoa),** *American Geophysical Union. Antarctic research series,* Apr. 1983 Vol.38, Biology of the antarctic seas 13, p.61-164, Refs. p.161-164.

The 29 species of Stylasterina known from the antarctic and subantarctic regions are described, and their distributions mapped. Thirteen new species and one new genus are described; the subgenus *Lepidopora* is raised to generic rank, and *Errina antarctica* forma *kerguelensis* is elevated to specific status. Species are arranged in order of their increasing morphological complexity. All species are illustrated by scanning electron micrographs, and several new terms are introduced to describe features of coenosteal microarchitecture. A historical review of all Stylasterina reported from the Antarctic is given. A zoogeographic analysis describes common patterns of species distributions, and the faunas of various geographic areas are discussed. (Auth.)

B-29320

Park, T., **Calanoid copepods of some scolecithricid genera from antarctic and subantarctic waters,** *American Geophysical Union. Antarctic research series,* Apr. 1983 Vol.38, Biology of the antarctic seas 13, p.165-213, Refs. p.210-213.

Isaacs-Kidd midwater trawl and Bongo plankton net samples from antarctic and subantarctic waters were examined for the calanoid copepods belonging to the scolecithricid genera other than *Scolecithricella* and *Scaphocalanus,* which were studied previously from the same samples. In all, 1286 adult copepods representing five genera and 10 species of the family Scolecithricideae were found, including a new species belonging to a new genus *(Landrumius antarcticus).* The adult male of *Lophothrix humilifrons* is described for the first time. *Lophothrix humilifrons* and *Landrumius gigas* are new records to antarctic waters, and *Lophothrix humilifrons, L. frontalis,* and *Scottocalanus thorii* are new to subantarctic waters. *Lophothrix thorsoni* Björnberg, 1975 is recognized as synonymous with *Landrumius gigas* (A. Scott, 1909). All species are characterized with pertinent descriptions and illustrations. (Auth.)

B-29321

Holman, H., Watling, L., **Amphipoda from the Southern Ocean: families *Colomastigidae, Dexaminidae, Leucothoidae, Liljeborgiidae,* and *Sebidae*,** *American Geophysical Union. Antarctic research series,* Apr. 1983 Vol.38, Biology of the antarctic seas 13, p.215-262, Refs. p.260-262.

In this examination of amphipods, chiefly from the Scotia Sea and Antarctic Peninsula regions, 14 species are considered. One new species, *Leucothoe orkneyi,* is described. Four forms of *Polycheria antarctica,* including one new form, *Polycheria antarctica* f. *nudus* f. nov., are described. Three variants of *Leucothoe spinicarpa* s.l. are distinguished, based on the form of gnathopod 1, but are not given official taxonomic status. A key to the known species of *Seba* is given with redescriptions of four of these species and three others of uncertain species affinity. In addition, two species of *Colomastix,* one of *Lepechinella,* and four of *Liljeborgia* are redescribed. (Auth.)

B-29323

Selkirk, P.M., Costin, A.B., Seppelt, R.D., Scott, J.J., **Rabbits, vegetation and erosion on Macquarie Island,** *Linnean Society of New South Wales. Proceedings,* 1983 106(3-4), p.337-346, 17 refs.

Rabbits were introduced to subantarctic Macquarie Island in about 1880. Selective grazing by rabbits has been important in changing the floristic composition and structure of grassland and herbfield vegetation and the effects of grazing and burrowing activities on erosion have concerned scientific visitors to the island for some years. Re-examination in 1980 of sites first documented in 1958 shows increases in erosion at some sites and revegetation of some areas. Photographic documentation is provided for both sets of observations, and changes noted in the 1980 photographs are discussed. The role of rabbits in erosion of grassland sites is difficult to assess and may in the past have been overestimated. (Auth.)

B-29324

Lee, J.-H., Fujimoto, K., Kaneda, T., **Antioxygenic and peroxide decomposition properties of antarctic krill lipids,** *Japanese Society of Scientific Fisheries. Bulletin,* 1981 47(7), p.881-888, 30 refs.

The antioxidant effect and the oxidation pattern of *Euphausia superba* lipids were followed during storage by determining the weight and the peroxide (POV) and carbonyl (COV) values. The lipids extracted with a mixture of chloroform/methanol showed considerable antioxidant properties when added to methyl esters of safflower oil. This effect did not seem to be consistent with the high content of polyunsaturated fatty acids. By means of various chromatographic techniques and mass spectrometry, the antioxygenic material was identified as alpha-tocopherol. Phospholipids, which comprised 41% of the total lipids, acted synergistically with alpha-tocopherol, but were not the primary antioxidants. During prolonged storage (45 C, 60 days) of krill lipids, no increase in POV was observed, as if the oxidation had been inhibited completely. However, during that period, an increase in COV was observed; it is thus concluded that peroxides did not accumulate because the hydroperoxides were decomposed to carbonyl compounds by phospholipids. (Auth.)

B-29325

Kobayashi, T., Yanagimoto, M., **De-carapace treatment of antarctic krill *Euphausia superba* by water jet,** *Japanese Society of Scientific Fisheries. Bulletin,* 1981 47(8), p.1069-1074, In Japanese with English summary. 3 refs.

Fresh antarctic krill were de-carapaced aboard ship using a water jet method. A vigorous flow of water, at flow rates between 23 and 46 l/min, was applied to the krill. The effects of flow rate, size of the vessel, time of treatment, nozzle diameter and amount of krill on the efficiency of carapace removal were studied to identify the optimum operating conditions. A high-pressure shower method, using sea water or a sea-water/air mixture at flow rates of up to 35 l/min and 80 l/min, respectively, was also evaluated. (Auth.)

B-29326

Nishita, K., Takeda, Y., Arai, K.I., **Biochemical characteristics of actomyosin from antarctic krill,** *Japanese Society of Scientific Fisheries. Bulletin,* 1981 47(9), p.1237-1244, In Japanese with English summary. 18 refs.

Actomyosin was prepared successfully from the frozen surimi of antarctic krill *E. superba* when all procedures were conducted in the presence of 1.5 M sorbitol at a low temperature (0-4 C). The actomyosin showed several well-known characteristics, such as high ATPase activity reversible dissociation into myosin and actin upon addition of Mg-ATP at high salt concentration and a superprecipitation reaction at low salt concentration; the subunit composition also consisted of heavy and light chains of myosin and actin. The values showed that krill actomyosin was about 100 times more unstable than that of Alaska pollack. Such inactivation of Ca-ATPase was found to be effectively prevented by adding 1.5 M sorbitol to the preparation. The biochemical characteristics of krill actomyosin seemed to be similar to those of fish and rabbit actomyosin in most respects except for the striking inferiority in the thermal stability. (Auth.)

B-29327
Haschemeyer, A.E.V., **Comparative study of protein synthesis in nototheniids and icefish at Palmer Station, Antarctica,** *Comparative biochemistry and physiology,* 1983 76B(3), p.541-543, 11 refs.

Protein synthetic rates were measured in tissues of *Notothenia coriiceps, N. gibberifrons* and *Chaenocephalus aceratus in vivo* at 2 deg C by a method in which high doses of 14C-phenylalanine are used for stabilization of specific radioactivity. Rates in *N. coriiceps,* as per cent of tissue protein synthesized per day, were: liver 10.4, head kidney 3.5, testis 2.6, spleen 2.1, kidney 1.9, gill 1.6, heart 1.4, pectoral muscle 1.0, epaxial muscle 0.37, brain 0.42. With the exception of liver and head kidney (9.8 and 3.4, respectively) all rates in the icefish *C. aceratus* were significantly reduced compared to the nototheniids, onsistent with the dependence of protein synthesis on oxidative me-abolism. Icefish lack hemoglobin in the blood. The effects of two-week starvation were tissue-specific. Rates declined markedly in ectoral and epaxial muscle, were unchanged in liver, kidney, brain, eart and testis, and were increased in gill and head kidney. The re-ults are discussed in relation to cold adaptation of antarctic fishes and o the adaptation of metabolism required during non-feeding periods nd for species which lack an oxygen-binding pigment in their blood. Auth.)

-29328
laschemeyer, A.E.V., Jannasch, H.W., **Antifreeze lycopeptides of antarctic fishes,** *Comparative biochemistry nd physiology,* 1983 76B(3), p.545-548, 8 refs.

A method is described for analysis of amino acid composition and oncentration of antifreeze glycopeptides of antarctic fish by automat- amino acid analysis of hydrolyzed samples purified by trichloroa-etic acid fractionation. Preparations were 98% pure and showed naracteristic alanine, threonine and proline compositions. Analyses ere carried out in 17 known species of Ross Sea, Antarctica, fishes nd in 11 undescribed species tentatively placed in genera, where ossible, or families. Collections have been preserved for classifica-on. The results provide evidence of species specificity in amino cid composition and plasma concentration of these substances. losely related species showed nearly identical Pro/Ala ratios, but ffering concentrations. The results do not support reclassification *Trematomus* and *Notothenia* into a single genus or the inclusion of e genus *Pleuragramma* in the family Nototheniidae. Data obtained r developing ovaries of 6 species showed concentrations of these bstances (per unit wet wt) about one-half those of plasma and simi-r, but not identical, amino acid compositions to those of plasma. ne total amount in eggs was 4 times that of plasma in pre-spawning dividuals. Calculations are presented to indicate the role of these bstances in the protein metabolic economy of the animal for Noto-eniidae and Channichthyidae. (Auth.)

-29329
latuda, K., **New midwater trawl for sampling constant pth horizon,** *Tokyo University of Fisheries. ransactions,* Mar. 1978 No.2, p.1-25, With Japanese mmary. 6 refs.

A new midwater trawl was developed in order to research quan-atively the distribution of krill *(Euphausia superba).* The newly de-gned net is towed with only an upper bridle, and can maintain a nstant working depth with the frame remaining at a normal angle to the towing direction irrespective of the towing speed, provided that the weight in water of the frame is negligibly small as compared with the resistance of the net. The mechanical characteristics of the net were examined by flume and field experiments. As a net closing device, an acoustical net release was successfully used. (Auth.)

B-29330
Kanda, K., **Preliminary experiment on the fish pump for catching live krill,** *Tokyo University of Fisheries. Transactions,* Mar. 1978 No.2, p.27-32, With Japanese summary. 2 refs.

In order to catch live krill continuously and on a large scale, a study of the application of the fish pump to fishing gear was carried out on board the *Shinyo-maru.* It was found that the stream line of the watermass in the net was smooth to the end of the codend during operation of the Kyoei Model 3 1/2B Type Volute Pump with variable speed drive powered by a 3.7 kW alternating current electric motor having an intake of 90 mm in diameter, and a pumping rate of 0.92 cu m/min at 1020 rpm for a pumping height of 5 m. As this pumping system is compact and light and simple to operate, we believe that it can be operated continuously and that it can bring the krill on board alive. (Auth.)

B-29331
Hamada, E., Koike, Y., Saito, K., Suzuki, H., **Radio controlled modern airplane for observing swarms of krill,** *Tokyo University of Fisheries. Transactions,* Mar. 1978 No.2, p.33-44, With Japanese summary.

The building and testing of a small radio-controlled airplane, equipped with cameras and an information telemeter for transmitting flight conditions, is reported. The object of the aircraft is to take aerial photographs for evaluation of size and shape of krill swarms.

B-29332
Kubota, M., Sakai, K., **Autolysis of antarctic krill protein and its inactivation by combined effects of temperature and pH,** *Tokyo University of Fisheries. Transactions,* Mar. 1978 No.2, p.53-63, With Japanese summary. 8 refs.

The process of autolysis was estimated by measurements of increases of non-proteinous nitrogen and liberated tyrosine in the course of incubation. The optimal temperature of krill autolysis was between 45-50 C in the range of assay of 4-70 C, and the optimal pH was at 7.0 in the range of assay of 2.2-7.0. Autolysis was slowed down by decreasing the pH value of the medium and ceased after treatments of the homogenate at 45 C and pH 2.2 or 50 C and pH 2.8 for 10 min. Inactivation of enzyme was attained by such treatments. Even in the case of incubation at 0 C for 10 min, the relative activity was lowered to 38% at pH 2.2 and 64% at pH 2.8 Accordingly, the combined effect of temperature and pH proved to be most effective for inactivation of krill protease. (Auth.)

B-29333
Tanaka, K., Matsuda, Y., Saito, T., **Freezing and defrosting of antarctic krill *Euphausia superba,*** *Tokyo University of Fisheries. Transactions,* Mar. 1978 No.2, p.65-79, With Japanese summary. 4 refs.

Euphausia superba was block-frozen by two types of contact freezers: the direct or the indirect expansion system. The heat transfer coefficient of block krill is much smaller than that of the whalemeat, therefore the contact freezer is not effective in block freezing of the krill. Frozen blocks of krill were defrosted by means of three different defrosting methods: by still air, running water and dielectric heat. It was found that the low temperature (below 5 C) still air defrosting method was the most effective. (Auth.)

B-29334

Kanda, K., Takagi, K., Seki, Y., **Movement of large swarms of antarctic krill *Euphausia superba* population off Enderby Land during 1976-1977 season,** *Tokyo University of Fisheries. Journal,* Mar. 1982 68(1-2), p.25-42, With French and Japanese summaries. 9 refs.

Largest swarms of antarctic krill population ever reported are described with special reference to their southerly movement which is considered to be a spawning migration. Two swarms of such large size were picked up by Japanese midwater trawlers in the range of 62 deg 25 min-65 deg 35 min S off Enderby Land for the 1976-1977 season. Fish finder records suggest their size was 560 and 1089 m, respectively, in average cross section. Both swarms showed a considerable trend of southerly movement in the direction of 180 deg 33 min or 172 deg 27 min over a distance of 46.3 and 115.9 miles, respectively. Such a total extent of movement means that their moving speed was 0.26-0.29 mph, while several phases of local moving speed are also considered. These facts are based principally on the ship's and fishing log books and fish finder records of a 3300 ton trawler. Some discussions of these results are given from the viewpoint of fishery biology. (Auth.)

B-29335

Kozima, T.T., Loan, D.T.N., **Frozen storage of antarctic krill,** *Tokyo University of Fisheries. Journal,* Mar. 1982 68(1-2), p.81-85, With Japanese summary. 4 refs.

Krill was block frozen by three freezing methods: whole body, untreated and uncooked, freezing after peeling and eviscerating, and freezing after cooking. Content of myofibrillar protein in muscle, pH of muscle and drip loss were measured during frozen storage at -20 C, -40 C and -100 C for six months. Preferable storage temperature of frozen krill was below -40 C, but frozen krill after cooking showed stability of its quality at any tested temperature. (Auth.)

B-29336

Watanabe, K., Asai, K., Oshima, T., Kuchino, Y., **Chemical structure and thermal properties of initiator tRNA from *Euphausia superba* in comparison with those of other eucaryotic initiator tRNAs,** *Journal of biochemistry,* Nov. 1981 90(5), p.1259-1266, 22 refs.

The nucleotide sequence of initiator tRNA (tRNAiMET) from *Euphausia superba,* was determined. The nucleotide sequence was very similar to that of mammalian tRNAiMET except for changes in six bases and three modifications: C16, U55, D47 and m5C48 are replaced by U16, psi 55 and unmodified U47 and C48, respectively. A50-U64 and G52-C62 base pairs of mammalian tRNAiMET are reversed in *Euphausia* tRNAiMET. In addition, the G49-C65 pair of the former is replaced by a less stable G49-U65 pair in *Euphausia* tRNAiMET. The sequence homology was compared between *Euphausia* tRNAiMET and over ten different species of eucaryotic tRNAiMET so far sequenced. The melting temperature of *Euphausia* tRNAiMET was 72.5 deg C, which is 4.2 deg C and 8.3 deg C lower than those of rat liver and yeast tRNAiMET, respectively. The origin of the thermal instability of *Euphausia* tRNAiMET is discussed in relation to its secondary structure compared with that of other eucaryotic tRNAiMETs. (Auth.)

B-29339

Schnack, S.B., ed, **On the biology of krill *Euphausia superba;* proceedings of the seminar and report of the krill ecology group, Bremerhaven, 12-16 May 1983,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, 303p., For selected papers see B-29340 through B-29359.

The seminar was under the auspices of the SCAR Group of Specialists on the Southern Ocean Ecosystem and its Living Resources. Major review areas include krill abundance, distribution, population dynamics, stock separation, swimming and feeding, and moulting. The seminar was divided along three main topics: early life history, physiology and biochemistry, and distribution and stock identity. Papers read at the seminar, summaries of discussion of the various subgroups (e.g. on early life history, physiology and biochemistry, and distribution and population) and a report of the working party on krill ecology are presented.

B-29340

George, R.Y., **Krill swarms and life cycle in relation to physical and biological oceanographic parameters in the southern ocean,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba; Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.9-19, 22 refs.

A review is presented of some behavioral aspects of krill as discussed in the 1982 Wilmington Symposium on Krill Swarms and Life Cycle. These aspects include swarming, feeding and energy flow, life cycle, and growth patterns. Recommendations are made for research to answer questions raised in these areas.

B-29341

Mujica, A., Asencio, V., **Distribution and abundance of krill larvae *(Euphausia superba* Dana),** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba; Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.21-29, 13 refs.

This is an analysis of samples from the FIBEX project by the Chilean expedition in January/February 1981. The results revealed the presence of intermediate developmental stages (metanauplius, calyptopis and first furcilias). The absence of the first phases may indicate their deeper distribution and the absence of the most advanced is possibly related to the reproductive period. The highest concentration of the larvae with a maximum density of 190,650 larvae/1000 cu m was found at both ends of the Bransfield Strait and in the vicinity of the South Shetland Islands. (Auth.)

B-29342

Hempel, I., **Studies in eggs and larvae of *Euphausia superba* and *Euphausia crystallorophias* in the Atlantic sector of the southern ocean,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba; Proceedings of the seminar and report of the kriil ecology group, May 1983. Edited by S.B. Schnack, p.30-46, 9 refs.

The paper describes the studies in geographical distribution of krill larvae *(Euphausia superba)* in the Scotia Sea and adjacent waters, in 1975-1981. Striking differences in overall abundance were found. In 1981, during FIBEX, larvae were obtained in very high numbers over oceanic depths. A limited number of deep hauls revealed a vertical stratification of the eggs and early larvae of *E. superba* with calyptopes near the surface while eggs and nauplii were mainly below 500 m. Two expeditions to the eastern and southern parts of Weddell Sea demonstrated the southern limits of the larvae of various species of euphausiids except the larvae of *Euphausia crystallorophias* which were widely distributed all along the edge of the Filchner Ice Shelf. In the southernmost part of Weddell Sea a detailed study gave indications for a developmental ascent of metanauplii and calyptopis I stages of *E. crystallorophias.* (Auth.)

B-29343

Makarov, R.R., **Geographical aspects of the investigation of the life history of *Euphausia superba* Dana,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.47-57, 32 refs.

Factors which influence the life history of krill are reviewed. These include latitude, seasonal and geographic fluctuations of plankton, growth rate with respect to latitude, changes in numbers of age-size groups, convergence zones of ocean currents, and variations in breeding cycles. Krill of different origins in different latitudes but living side by side have different life style features.

B-29344

Makarov, R.R., **Some problems in the investigation of larval euphausiids in the Antarctic,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.58-69, 31 refs.

A thesis is presented which holds that in order to understand *Euphausia superba* it is necessary to study and understand various other euphausiids to provide a comparative basis for identifying adaptations and unique biological features of *Euphausia superba.* Four euphausiid species are reviewed in their larval stages for distribution, breeding grounds, depth and season, migration, and duration of larval development.

B-29345

Marschall, H.-P., **Sinking speed of krill eggs and timing of early life history stages,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.70-73, 7 refs.

In this extended summary, results are given in text and tables of research conducted aboard RRS *John Biscoe* during a joint biological expedition in February 1982.

B-29346

Buchholz, F., **Moulting and moult-physiology in krill,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.81-88, 12 refs.

Difficulties are pointed out in experiments with krill moulting in confined aquaria with a much less than optimal food supply. *In situ* studies are equally difficult because of frigid weather conditions. A review of reports by workers in these areas generally produces agreement on these points. More sophisticated aquarium facilities gave better results for determining moult periods and growth rates.

B-29347

Mayzaud, P., **Potential relationships between particulate matter and nutritional processes of *Euphausia superba.* A review of the results obtained during the MD25/FIBEX cruise,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.92-101, 8 refs.

In the pelagic environment, the sequence of physiological phenomena which govern biological productivity is now well establsished. Animals must locate their food and when possible ingest it. Once this has been done, enzymes facilitate the assimilation of a portion, the residual being discarded as feces. Of that assimilated, one portion is respired to provide energy for all life processes and another dissipated in the urine. The residual constitutes growth whether the end product be new tissue, reproductive products or stored energy. During the FIBEX cruise in the Indian sector of the Antarctic ocean of the R.V. Marion-Dufresne, studies on the nutritional process of *Euphausia superba* were aimed at a definition of the trophic environment, an evaluation of the feeding-digestion relationships and an estimation of the krill productivity. Summary data are presented.

B-29348

Clarke, A., Morris, D.J., **Development of an energy budget for *Euphausia superba,*** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.102-110, 9 refs.

Previous energy budgets for krill are reviewed and found inappropriate. This is believed to be an important aspect of the model and is included as a model parameter. Details and refinements of the model are discussed.

B-29349

Morris, D.J., **Experimental investigations of the ecological physiology of *Euphausia superba,*** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.111-120, 5 refs.

Recently, the aquarium facilities at South Georgia have been used to overcome some of the limitations of shipboard studies, and to investigate aspects of the physiology of krill over periods of weeks rather than days. This paper outlines the results of those investigations. Data will be presented more completely elsewhere. Parameters for the studies include filtration rate, system perturbation, flow rate, current speed, chamber volume, krill density, and oxygen tension. From these data an ideal experimental apparatus is suggested.

B-29350

Clarke, A., **Biochemistry of *Euphausia superba,*** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.121-124, 8 refs.

Biochemical studies of krill have concentrated on proximate composition or the lipid fraction. A major gap in knowledge of lipids is whether males also show a summer increase as do females and youngsters and as do all groups during winter. A need exists for a determination if there is an overwintering lipid synthesis in krill, a phase of research now being addressed. Recommendations are made regarding procedures as to how this research should be done.

B-29351
Kils, U., **Swimming and feeding of antarctic krill, *Euphausia superba*,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.130-155, 30 refs.

Antarctic krill are remarkable creatures. They are 60 times heavier than their pacific cousins; they have an unusually large step size from the size of their food to their size; respiration rates are much too strong for their size; they have an overproportional food intake with increasing animal size. Details of these characteristics were confirmed during experiments on FS *Meteor* near the Antarctic Peninsula in summer 1980/81. The flow chamber for the experiments is shown in text and schematic diagram; the structures and functions of the krill swimming and feeding apparatus are explained, indicating highly efficient mechanisms for these activities.

B-29352
Everson, I., **Estimation of krill abundance,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.156-168, 2 refs.

Various factors for estimating krill abundance and the refinements necessary for making a reasonable estimate are discussed. It is not sufficient merely to estimate the mass of krill in the southern ocean. The rate of change in abundance must also be considered. The rate depends on the depths at which various predators function well: fish and squid operate from the surface to the bottom; whales and Weddell seals dive to 600 m; penguins and other seals to 260 m; and albatrosses and petrels to 2 m. Predators prey mostly on larger krill so the abundance rate also depends on where the larger krill congregate. Other factors to consider are the methods of estimation. The primary methods involve nets or hydroacoustic measurements. Intricacies of using these methods are discussed.

B-29353
Guzmán F., O., **Distribution and abundance of antarctic krill *(Euphausia superba)* in the Bransfield Strait,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.169-190, 14 refs.

The main results obtained during the first three Chilean expeditions and during FIBEX are presented. Several important conclusions are deduced: krill maintains an important biomass and shows swarming behavior through the year in Bransfield Strait; under the pack-ice that surrounds the South Shetland Islands during winter, high larvae densities and juvenile krill were found. Finally, the possible ecological process that enables the occurrence of these behaviors is discussed. The marine currents prevailing in the zone and the influence of the pack-ice could be the most important factors for the distribution of the advanced larval stages as well as for the recruitment of the juvenile krill from the adult population fraction. (Auth. mod.)

B-29354
Antezana, T., Ray, K., **Aggregation of *Euphausia superba* as an adaptive group strategy to the antarctic ecosystem,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.199-215, 41 refs.

The model described is a series of working hypotheses addressing the role of krill feeding in the formation, maintenance, and dispersal of krill aggregations. Small foraging schools locate feeding grounds, and assemble into large scale aggregations, where feeding occurs in semi-stationary swarms until the depletion of food resources, whereupon disengagement of the swarm into small schools occurs, whose foraging is associated with horizontal and vertical migrations. The integration of krill schooling, swarming, and their diverse feeding displays and migratory behaviors beneath the framework of one overall feeding strategy is based on principles in behavioral and social ecology, field data by the authors suggesting the important role of feeding in large scale krill aggregations north of Elephant Island, and a bit of imagination. We present the model as a series of working hypotheses to aid in evaluating the adaptive significance of gregarious behavior of krill in general. (Auth.)

B-29355
Nasu, K., **On the geographic boundary of antarctic krill distribution,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.216-222, 4 refs.

The paper defines the geographic limits for gathering data on krill distribution, i.e., krill swarms. The hypothesis is presented that krill require an even temperature over reasonably long distances and a high concentration of salt nutrients. The environment meeting these needs occurs south of the Antarctic Divergence in the East Wind Drift where meandering oceanic fronts and cyclonic and anticyclonic circulations are located. An oceanographic environmental survey to test the hypothesis should be made in the Antarctic Divergence zone.

B-29356
Siegel, V., **Population structure of *Euphausia superba* in the eastern part of the Bransfield Strait,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.227-238.

The paper is comprised of 9 graphs with textual explanation of each. The graphs cover the region northeastward of the tip of the Antarctic Peninsula and show krill distribution during the austral summer months. Subjects of the graphs are gravid, spawned, and adult females and juveniles.

B-29357
MacDonald, C.M., Schneppenheim, R., **Breeding structure and stock identity in the antarctic krill *Euphausia superba* Dana,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba;.Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.240-245, 3 refs.

Electrophoretic analysis of proteins has recently been employed to estimate the geographical and temporal distribution of genetic variation in krill, thereby providing information on breeding structure of the species. Electrophoretic data obtained so far from samples collected around the Antarctic Peninsula and from the Antlantic and Indian Ocean sectors of Antarctic waters support the hypothesis of a single interbreeding population of krill throughout the sampled range of the species. Further sampling from all areas of Antarctic waters and repeated sampling in key locations is required to confirm this finding. (Auth. mod.)

B-29358

Grant, W.S., **Population genetics of krill and comparison with other marine organisms,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba; Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.246-266, 38 refs.

The results of genetic studies of several marine and aquatic organisms are compared to the results of previous electrophoretic studies of krill using genetic distance, gene-diversity analyses, and gene-flow analyses. These comparisons show that pelagic species, which have large population sizes and large potentials for gene flow between populations, show little genetic subdivision over several thousand kilometers. The potential causes of genetic subdivision in pelagic species are reviewed from a population genetic point of view, and it is concluded that, if genetic subdivision among krill populations exists, the most likely cause is adaptive divergence following the imposition of a physical barrier to migration. (Auth. mod.)

B-29359

Miller, D.G.M., **Krill biology and FIBEX: some problems of cooperative data analysis relevant to the planning of SIBEX,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Dec. 1983 Special issue No.4, On the biology of krill Euphausia superba; Proceedings of the seminar and report of the krill ecology group, May 1983. Edited by S.B. Schnack, p.285-296, 7 refs.

Some of the problems encountered during the cooperative analysis of krill biology data during FIBEX are reconsidered. A set of simple data queries are described in an attempt to assist planning and analyses of SIBEX results. (Auth.)

B-29366

Strzetelski, J., Ryś, R., Lipiarska, E., **Use of krill meal in feeding calves** [Zastosowanie maczki z kryla w żywieniu cielat], *Roczniki naukowe zootechniki,* 1981 8(2), p.113-122, In Polish with English, German and Russian summaries. 5 refs.

Forty Black Pied Lowland bull calves were raised from 6 to 120 days of age on limited amounts of milk replacer. Milk replacer was given from 6 to 35 days of age (13.3 kg per calf). Then, four experimental groups were offered four different concentrate mixtures containing soy bean oilmeal (34.5%, group I), fish meal (28.5%, group II), krill meal (28%, group III) and fish meal and krill meal (14% of each, group IV). It was found that 28% of krill meal in the mixture for calves raised on limited amounts of milk reduced body weight gains, nitrogen retention and digestibility of protein. Average daily gains in groups I-IV were 791, 771, 499 and 682 g, respectively. (Auth.)

B-29367

Grajewska, S., Kortz, J., **Effect of krill meal in pig feed ration on the performance and carcass traits** [Wplyw maczki z kryla w żywieniu świń na wyniki tuczu i wartość rzeźna tusz], *Roczniki naukowe zootechniki,* 1981 8(2), p.229-242, In Polish with English, German and Russian summaries. 11 refs.

An experiment was conducted on 72 pigs of 36 kg initial body weight, randomly allotted into three groups. The control group (K) was fed a ration composed of ground barley 85% and protein concentrate Provit 15%. In experimental rations (D5 and D10) 5 or 10% of Provit were replaced by krill meal. The rations contained 14.9% (K), 15.6% (D5) and 17.3% (D10) of digestible crude protein. Fattening period lasted 120 days. Six weeks before its termination krill meal in the D5 and D10 rations was replaced by Provit concentrate. Carcass evaluation, and visual assessment of health state of the internal organs were performed after slaughter. The use of krill meal in pig rations increased the daily gains throughout the fattening period (K-611, D5-659 and D10-717 g/day). Replacement of krill meal by Provit in the final period of the experiment reduced the rate of daily gain mainly in pigs of group D10. Pigs of the experimental groups had a higher dressing percentage, more fatty carcasses and a lower relative weight of meat in prime cuts. No effect of krill meal on the health status of pigs was observed. (Auth.)

B-29368

Grajewska, S., Kortz, J., Witkowska, A., **Meat quality, backfat characteristics and some blood plasma constituents in pigs fed with krill meal** [Ocena jakości miesa, sloniny i niektórych skladników osocza krwi świń żywionych maczka z kryla], *Roczniki naukowe zootechniki,* 1981 8(2), p.243-258, In Polish with English, German and Russian summaries. 16 refs.

Seventy-two pigs of 36 kg initial body weight were randomly allotted into three feeding groups. The control group (K) was fed a ration without krill meal, the experimental rations (D5 and D10) contained, respectively, 5 and 10% of krill meal. Crude protein content was 14.9, 15.6 and 17.3% in rations K, D5 and D10, respectively. Total body weight gains in these groups were 68.6, 74.0 and 80.4 kg. The addition of 10% of krill meal into pig rations increased the unsaturated fatty acid content in the backfat, as might be inferred from the higher values of iodine number and refractive index. No significant changes in the physical and chemical traits of meat quality and in lipid peroxides level were observed. Some less acceptable sensory traits of meat were found in pigs given 10% of krill meal throughout the fattening period. The taste in roasted meat and flavour in cooked meat and in bouillon were adversely affected. The addition of krill meal to the ration increased the thyroxine level in the blood and inorganic phosphate in the meat. (Auth.)

B-29369

Grudniewska, B., Kurcman, B., Plonka, S., Paschma, J., **Nutrient digestibility and nitrogen balance in piglets weaned at four weeks, fed complete mixture containing krill meal** [Strawność skladników pokarmowych i bilans azotu u prosiat odsadzonych w 4 tygodniu, żywionych mieszanka pelnoporcjowa z udzialem maczki z kryla], *Roczniki naukowe zootechniki,* 1981 8(1), p.157-166, In Polish with English, German and Russian summaries. 13 refs.

Nutrient composition of the mixtures, nutrient digestibility coefficients and daily nitrogen (N) balance were determined in piglets fed mixtures containing fish meal (control group) or krill meal in proportions 4.0, 8.5 and 13.0% (experimental groups). Apparent digestibility coefficients of organic matter and crude protein were high in all the mixtures. For protein they amounted to 80.9, 80.4, 80.8 and 80.0%

for mixtures 1, 2, 3, and 4, respectively. Daily N balance was the highest in the group fed mixture 2 (4% of krill meal). N utilization from the mixtures containing higher level of krill meal (3 and 4) was slightly poorer in comparison with mixtures 1 and 2. N retention in groups 1 to 4 was 55.57, 57.00 50.48 and 47.93% of N intake. It was found that krill meal may be used as a valuable component of complete feed mixtures for piglets. (Auth.)

B-29370

Niedźwiadek, S., Kawińska, J., **Using krill meal in rabbit fattening** [Badania przydatności maczki z kryla w tuczu królików], *Roczniki naukowe zootechniki,* 1981 8(1), p.245-253, In Polish with English, German and Russian summaries. 7 refs.

The purpose of the study was testing a possibility of replacing feeds of animal origin: fish and meat-bone meals by krill meal in a pelleted mixture for fattening young rabbits. The experiment was conducted on 300 rabbits of White New Zealand breed, fattened from 28 to 90 days of age on mixtures with 3 and 6% of krill meal added and containing 19-21% of crude protein, 5% of fat and 10% of crude fibre. Rabbits fed pellets containing 6% of krill meal showed the best gains and reached 2490 g body mass at 90 days of life. Average body mass gain over the fattening period was 1904 g. Body gains in this group were higher by 7.79% in comparison with the group fed pellets without krill meal. Feed conversion and digestibility coefficients were the best in rabbits fed pellets containing 6% of krill meal. Slaughter yield and meat value were similar in all groups, the yield of edible part was 53.6-54.4%. Meat content in carcass and quality of meat did not show any significant differences between feeding groups. The results showed that meals of animal origin may be replaced by 6% of krill meal in pelleted mixtures for fattening young rabbits. (Auth.)

B-29371

Plonka, S., Paschma, J., Grudniewska, B., Pijarowski, A., **Results of rearing piglets weaned in the 4th week of age and fed complete feed mixtures containing krill meal till the 65th day** [Wyniki odchowu prosiat do 65. dnia odsadzonych w 4. tygodniu i żywionych mieszanka pelnoporcjowa z udzialem maczki z kryla], *Roczniki naukowe zootechniki,* 1981 8(1), p.167-175, In Polish with English, German and Russian summaries. 13 refs.

A possibility was studied of replacing soy-bean meal and fish meal by krill meal in prestarter mixtures for piglets. The experiment was conducted on 4 groups, 50 litters in each; the groups were differentiated as to the krill meal level in prestarter mixture. Group I (Control) and II, III, IV were given mixtures containing 0, 4.0, 8.5 and 13.0% of krill meal, respectively. Prestarter mixture was offered to piglets from the 7th day of life and from the 28th day, i.e. after weaning it was given *ad libitum* till the 65th day of life. Incremental levels of krill meal in the mixtures did not cause significant differences in the growth rate of piglets. The highest weight of litters on the 65th day was reached by piglets in group III, 143.50 kg; the lowest, in group IV, 133.94 kg. In groups I and II the highest number of piglets reared till the 65 day was observed, 9.0 and 9.1, respectively. Prestarter conversion per 1 kg body weight gain was similar in groups I, II and IV (0.93, 0.96 and 0.98 kg) and lower in group III, 0.90 kg. Till the 65th day of life most cases of scouring occurred in group IV, 22%, the least in I, 6%. The lowest mortality was in group II, about 11%; the highest, in group III, reached 16%. (Auth.)

B-29372

Loś, J., Ambroziak, W., **Automatic ion-exchange chromatography of di- and monosaccharides** [Automatyczna chromatografia jonowowymienna di- i monosacharydów], *Lodz. Politechnika. Zeszyty naukowe,* 1981 No.384, Technologia i chemia spożywcza No.36, p.45-56, In Polish with English and Russian summaries. 4 refs.

Examples of carbohydrate composition analyses of various biological materials are given, such as frozen krill extract hydrolisates, fermentation liquids, and enzymatic yeast hydrolisates; their usability in biological research is pointed out. (Auth.)

B-29373

Cieslar, P., Wawrzynczak, S., Frycz, I., **Effect of concentrates containing krill meal used for feeding calves on fattening results and slaughter value of bulls** [Wplyw żywienia cielat mieszankami treściwymi z udzialem maczki z kryla na wyniki opasania i wartość rzeźna buhajków], *Roczniki naukowe zootechniki. Monografie i rozprawy,* 1981 Vol.19, p.121-130, In Polish with English, German and Russian summaries. 21 refs.

45 Black-and-White Lowland bull calves were used in a study in which they received prestarter and starter diets containing (I) 15% fish meal; (II) krill meal as a total substitute for fish meal; and (III) equal quantities of protein from fish meal and krill meal. The bulls were slaughtered at 450 kg live wt. Data are given for carcass wt., wt. loss during chilling, slaughter yield, % kidney fat, % internal fat, yields of various cuts, side wt., % meat, fat and bones in the side, wt. of meat in 5 prime cuts, loin eye area, moisture, lipid and protein content, and organoleptic properties of the meat. Little effect of diet on these characteristics was observed.

B-29374

Hoshiai, T., ed, Naito, Y., ed, **Proceedings of the Fifth Symposium on Antarctic Biology,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, 128p., For individual papers see B-29375, B-29377 through B-29388 and J-29376.

The fifth Symposium on Antarctic Biology was held at the National Institute of Polar Research, Tokyo, from Sept. 17 to 19, 1981. The papers presented cover physical and chemical oceanographic properties, primary production and related properties, zooplankton and krill biology, fish biology, and marine mammal and sea bird ecology.

B-29375

Naganobu, M., Hirano, T., **Geographical distribution of the antarctic krill, *Euphausia superba* Dana, and its environmental structure,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.1-4.

Krill distribution in January, February and March, and the water temperature index associated with the distribution of high krill densities in the area from 45 E to 120 E, are presented.

B-29377

Satoh, H., Shibata, Y., Yamaguchi, Y., **Distribution of nutrient salt and phytoplankton in the Antarctic Ocean,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.13-19, 16 refs.

The phytoplankton standing stock and the nutrient concentration around the Balleny Islands were compared with those in the vicinity of the pack ice. The concentrations of phosphate, nitrate and chlorophyll-*a* fluctuated noticeably around the Balleny Islands; on the other hand, silicate concentrations fluctuated in the vicinity of the pack ice. The concentrations of silicate around the Balleny Islands were more abundant than those observed in the vicinity of the pack ice. An inverse relationship between the concentrations of chlorophyll-*a* and those of nitrate was observed in the vicinity of Young Island. The opposite relationship may suggest that nitrate and phosphate were taken up by phytoplankton. The maximum concentration of chlorophyll-*a* was observed at 66 20 S, 162 05 E, where the dominant species were *Thalassiosira gravida, Chaetoceros dichaeta* and *Fragilariopsis kerguelensis*. (Auth.)

B-29378

Uno, S., **Distribution and standing stock of chlorophyll *a* in the Antarctic Ocean, from December 1980 to January 1981,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.20-27, 14 refs.

Water samples for phytoplankton chlorophyll *a* and phaeopigments were collected by RV *Kaiyo Maru* in her FIBEX cruise in the Indian sector of the Antarctic Ocean during December 1980 to January 1981. Vertical distribution of chlorophyll in the eastern area showed quite different patterns from those of the western area. In the eastern area (December 1980) the chlorophyll maximum was found at the surface and the layer between 10 and 30 m of depth. In the western area (January 1981) the maximum was noticed in deeper layers between 50 and 125 m. The mean standing stock of chlorophyll in the water column was also high (28.3 mg/sq m) in the eastern, and low (16.8 mg/sq m) in the western area. The amount of chlorophyll in the region of the present investigation was considerably lower than in the other oceans of the world, despite the fact that the concentration of dissolved nitrogen was identical. (Auth.)

B-29379

Nakamura, M., Kadota, S., Fukuchi, M., **Epipelagic copepods of Calanoida in the Indian sector of the Antarctic Ocean,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.28-31, 4 refs.

Nineteen species of calanoid copepods are identified and the general feeding habits of each species are tabulated. Horizontal and vertical distributions of the epipelagic copepods off Showa Station are presented.

B-29380

Minoda, T., Hoshiai, T., **Zooplankton community in the Cove of Cumberland Bay, South Georgia, in the southern summer from January to February 1973,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.32-37, 7 refs.

Zooplankton was collected from the littoral water of South Georgia during January and February 1973. Ten species of pelagic copepods were identified of which *Calanus acutus, C. simillimus, Drepanopus forcipatus* and *Oithona frigida* were the main constituents. Most copepods are known as subantarctic or antarctic species. *Drepanopus forcipatus* was the most numerically important species found. Abundance of copepods was observed on 1-4 and 19-20 February. Copepod nauplii and the pelagic larvae of benthic worms gave evidence of active production during the period of sampling. Serial surface samplings showed that *Calanus acutus, C. simillimus* and *Drepanopus forcipatus* swarmed around the water surface at night. (Auth.)

B-29381

Kikuno, T., **Observation of early development of the antarctic krill,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.38-43, 12 refs.

Krill was collected in the Indian sector of the antarctic ocean by a 0-36 m oblique tow using the KOC-A net on January 24, 1980 and by a 0-103 m oblique tow using the KYMT net on January 22, 1981. Water temperature was kept at +0.4 C throughout the 1980 experiments, and about 0.0-1.0 C in 1981. The post-hatching development toward the metanauplius stage was observed in 1980 while the cleavages of two- to 64- cell stages were observed in 1981. In 1980 only the starting time of each stage from nauplius I to metanauplius was obtained because the range could not be examined. It took about 9.3-10.3 hours for the released eggs to start cleavage, seven days for hatching and 25 days to reach the metanauplius stage. Metanauplius was the most developed stage obtained in this study since all larvae died at this stage. The developmental rate of the eggs and larvae observed in this study was relatively slow, being about 4-9 hours for the two-cell stage, about 4 days for hatching and about 15 days for the metanauplius stage. (Auth.)

B-29382

Nakajima, Y., Watanabe, K., Naito, Y., **Diving observations of the marine benthos at Showa Station, Antarctica,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.44-54, 10 refs.

In January 1981, 15 diving investigations were made of the benthos at three locations around Showa Station. A total of 87 animal species and 3 algal species were collected. At the Nisi-no-ura Cove location, qualitative and quantitative collections of the sandy bottom samples were made. The biomass was under 500 g/sq m. The bivalve, *Adamussium colbecki,* was distributed zonally at depth of 3 m. In the highest density zone, the biomass of the shellfish reached about 2 kg/sq m. The Kita-no-ura Cove, with a gentle slope and a rocky bottom, had a very rich fauna. There was little life in shallow water (5 m) except for small, motile animals. Below 5 m animals were very abundant. Some species compositions were changed around 10 m in depth. At the Kita-no-seto Strait location, an area with a steep rocky slope, the landscape was almost the same as that of the former location, but the number of animals was lower. In this area many sea urchins, some of which had two species of algae on them, were found. Except for those which were attached to sea urchins, frondose algae were hardly found. (Auth.)

B-29383

Iwami, T., Abe, T., **Notes on the fishes collected during the 1980-1981 exploratory bottom trawl fishing off the South Shetland Islands,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.55-63, 15 refs.

Species composition of the bottom trawl collection from waters off South Shetland Islands is presented by number of species and specimens. Description of the embryos and the egg-capsules of the rajid fishes and of *Trematomus hansoni* with abnormally developed lower lateral line is given. Two species discovered for the first time in the west antarctic are also described. A total of 3576 specimens examined are referred to 9 families and 36 species. *Notothenia gibberifrons* is by far the commonest (50.2% of fishes examined) and is the dominant species at most stations. *Gymnoscopelus nicholsi* and *Chionodraco rastrospinosus* are second in abundance. Comparison with the channichthyid fishes collected from the Ross Sea in 1979, shows that the genus *Chionodraco* is dominant among the family *Channichthyidae* in both areas. *Pogonophryne scotti* and *Chionodraco myersi*, which had been recorded only from east Antarctica, were collected for the first time. The circumpolar distribution of *P. scotti* and *C. myersi* is inferred from the present records. (Auth.)

B-29384

Naito, Y., Iwami, T., **Fish fauna in the northeastern parts of Lützow-Holm Bay with some notes on the stomach contents,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.64-72, 8 refs.

Investigations on fish fauna were carried out in the northeastern parts of the Lützow-Holm Bay, in 1980, by trap gear and angling. A total of 35 stations were set in selected depth ranges of 20-100 m of littoral zone, 100-200 m of continental shelf or sublittoral zone, and 200-840 m of glacial trough zone for vertical distribution. The stomach contents of 75 specimens were also investigated. The dominant fish species was *Trematomus bernacchii* in the littoral zone. *T. hansoni* was dominant in the continental shelf or sublittoral zone. In the deeper glacial trough zone, *I. scotti, T. loenbergii* and *Austrolycichthys brachycephalus* appeared. Amphipoda, Euphausiacea, fish eggs and Polychaeta appeared in high frequency (20-40%) in the stomach of these fishes. (Auth.)

B-29385

Watanabe, K., Nakajima, Y., **Vertical distribution of chlorophyll *a* along 45 E in the southern ocean, 1981,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.73-86, 20 refs.

Surface and vertical observations of chlorophyll *a* were carried out from the fast ice region to the north of the Subtropical Convergence (STC) on board the icebreaker Fuji in February and March 1981. Sampling stations were arranged along the 45 E meridian including nine vertical observation stations from 67/36 S (in polynya) to 43 18 S (in the subantarctic water) and nine other vertical observation stations located in a grid pattern in the area of 35-45 E, 60-65 S. At the latter vertical observation stations, the pattern of chlorophyll *a* distribution showed little latitudinal variation but large longitudinal variations. Subsurface chlorophyll *a* maximum was seen at 75-85 m deep at 65 E stations, at about 105 m deep at 62 30 S stations and was not clear at two 60 S stations. These maxima seemed to coincide with the temperature minimum layer. This is presumed to be related to the circumpolar structure of the antarctic waters as seen from vertical profiles of temperature and salinity. Chlorophyll *a* standing stock along the 45 E meridian was 44 mg/sq m, integrated from the surface to a depth of 200 m, in the water column under fast ice, and 13 mg/sq m in the pack ice water. The maximum integrated chlorophyll a (75 mg/sq m) was obtained at a 62 30 S station. The data from the pack ice and the fast ice area showed large variations and they suggest high standing stock of phytoplankton in some part of the ice-associated area. (Auth.)

B-29386

Ohyama, Y., Naito, Y., **Visual observations of the antarctic sea birds during the FIBEX cruise of the *Kaiyo Maru*,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.87-93, 9 refs.

The research vessel *Kaiyo Maru* carried out the FIBEX survey in the Indian sector of the Antarctic Ocean during the austral summer of 1980-81. Visual observation of sea birds was made along the cruise tracks in the area from 30 E to 85 E longitudinally and to the south of 55 S, particularly from 61 S to the ice edge. Species and numbers of sea birds recognized in a ten-minute observation were recorded. The ten-minute observations were made every four hours, six times a day. The bird species observed frequently were: antarctic petrel, white-chinned petrel, cape pigeon, light-mantled sooty albatross, and prions. Longitudinally, these birds showed an even, circumpolar distribution. Latitudinally, however, they showed a different distribution, although they extended to the south with the retreat of the ice edge. (Auth.)

B-29387

Kato, H., **Outline of the antarctic minke whale assessment cruise (IWC/IDCR) in 1978/79 and 1980/81,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.94-107, 21 refs.

The numbers of minke whales sighted were 5322, 4357 and 5213, of which 728, 703 and 474, respectively, were marked with .410 "Discovery" whale markings. The systematic data obtained from this investigation contributed not only to stock assessment but also to the development of estimation techniques of whale population. It is estimated that approximately 330 thousand minke whales of exploitable stock size are available in the Antarctic. (Auth. mod.)

B-29388

Ohsumi, S., Kasamatsu, F., **Whale sighting efficiency of the crew on board ocean research vessels in BIOMASS/FIBEX,** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.108-119, 3 refs.

Two whalers with long experience in whaling operations were on board two ocean research vessels from Japan which participated in the BIOMASS/FIBEX project. They were engaged in whale sightings on the navigation bridge with the crew and apprentice students to examine the whale sighting efficiency of the crew. It was found that species identification of whales was very difficult for the crew without the help of experienced whalers. Synthesizing the results on the number of whale schools sighted per unit of the research distance and per unit of the number of crew, as well as on the range of visual field of sighting and the finding rate in the course of navigation, the whale sighting efficiency of the crew of the ocean research vessels was 3.2%, and the efficiency of the whalers on board ocean resarch vessels was 50%. (Auth.)

B-29389

Macdonald, J.A., **Neuromuscular cold-adaptation in an antarctic fish,** *New Zealand antarctic record,* 1983 5(2), p.1-10, 14 refs.

At temperatures of 0 C and lower, spontaneous miniature endplate currents (MEPCs) recorded extracellularly from extraocular muscles of a common antarctic fish, *Pagothenia borchgrevinki*, decay faster than MEPCs from cold-blooded temperate animals. The fast decay is believed to be due to higher proportions of unsaturated fatty acids in the antarctic fish, producing membranes which are less viscous at low temperatures. Decay of antarctic MEPCs is also less affected by changes in temperature. The results agree with independently derived theories explaining the mechanisms of cold and adaptation and chemical anaesthesia. (Auth.)

B-29396

Smith, R.I.L., **Colonization and recovery by cryptogams following recent volcanic activity on Deception Island, South Shetland Islands,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.25-51, 51 refs.

The sparse and floristically impoverished vegetation of Deception Island before the three eruptions of 1967-70 is described. Much of the pre-eruption vegetation was destroyed through burial by ash, mud and other tephra, but recovery by acrocarpous mosses has been possible where burial was only a few centimeters deep or where most of the deposits were quickly removed by wind or down-washing. Pleurocarpous mosses were unable to regenerate unless the deposits were removed completely. New stable soil surfaces are slowly being recolonized locally by bryophytes and lichens. Areas where geothermal activity has persisted provide unusual but favorable habitats, and support several taxa new to the island and some new to the Antarctic biome. The floras associated with such fumaroles and experiments to investigate the propagule bank of barren soils are discussed in relation to the hypothesis that Antarctic regions receive an influx of spores transported long distances by wind from more northerly latitudes. Unless the spores are genetically and physiologically preadapted to the prevailing conditions, however, germination and subsequent growth and survival of the progeny cannot proceed. At least some of the apparently exotic taxa that grow on most soil may thus be considered as native but are unable to grow under normal polar conditions. (Auth.)

B-29397

Luxmoore, R.A., **Comparison of the respiration rate of some antarctic isopods with species from lower latitudes,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.53-65, 30 refs.

The oxygen consumptions of two antarctic isopods were measured at temperatures ranging from -1.5 to +4.5 C and were found to be related to dry weight and temperature. Activity was shown to increase the metabolic rate by a factor of up to 3.6 and the animals were also found to be susceptible to handling disturbance. This necessitated care with the experimental technique and refinements to the simple sealed-chamber respirometry methods to obtain a reliable estimate of resting metabolic rate. The difficulties of comparing respiratory rates of different organisms, when variations in both environmental temperature and body weight must be taken into account, are discussed and a method is suggested to overcome these problems. Respiratory data for the antarctic isopods were compared with those of temperate species. They were found to show no evidence of elevation attributable to metabolic cold-adaptation, and appeared to obey the predictions of the Arrhenius equation. (Auth. mod.)

B-29398

Hawthorn, G.R., Ellis-Evans, J.C., **Benthic protozoa from marine antarctic freshwater lakes and pools,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.67-81, 36 refs.

Eighty-two species of benthic Protozoa have been isolated from a variety of Maritime Antarctic freshwater lakes and pools. Of these, 43 species were new records from Antarctica. All the Protozoa were cosmopolitan and, with few exceptions, of small size. Flagellates and ciliates showed the greatest species diversity but flagellates and amoebae dominated numerically. Cluster analysis identified differences in species composition between lake populations and pool populations. However, despite the wide range of trophic status evident within the two groups of systems, population composition was remarkably similar within each group. Seasonal fluctuations, both in major groups and individual species, were linked with fluctuations in numbers and activity of algae and bacteria. A large proportion of the rhizopod population was always encysted whereas flagellate cysts normally constituted less than 5% of the total population. It is concluded that flagellates are the most important protozoan group in these polar freshwater systems and constitute a potentially substantial grazing component. (Auth.)

B-29399

North, A.W., Burchett, M.S., Gilbert, C.J., White, M.G., **Identification of fish from the southern ocean by means of otoliths,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.83-94, 7 refs.

The otoliths of 21 species of fish from the southern ocean are illustrated by photographs. They include otoliths from the demersal Mototheniidae and Channichthyidae, the midwater Myctophidae and other common nearshore fish species. The measurement of the otoliths and the size of the fish from which they are taken are also given. Fish identification based upon external shape and structure of otoliths was feasible. Otoliths undergo morphological changes during the life-cycle of the fish. However, once the fish reach the adult stage there is relatively little change in shape and structure of the otolith, though there is a continuing increase in size as the fish becomes older. (Auth.)

B-29400

Oliver, P.G., Picken, G.B., **Prosobranch gastropods from Signy Island, Antarctica: Buccinacea and Muricacea,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.95-115, 23 refs.

Descriptions of new species of neogastropod belonging to the genera *Prosipho, Proneptunea* and *Trophon* are presented along with notes on other species from Signy Island. The majority of species were collected in shallow sublittoral habitats. It is suggested that in the sublittoral zone considerable local speciation has occurred through both physical and biological isolation of the islands within the Scotia Arc. (Auth.)

B-29403

Ponder, W.F., **Rissoaform gastropods from the Antarctic and Sub-antarctic: the Eatoniellidae, Rissoidae, Cingulopsidae, Orbitestellidae Rissoellidae (Mollusca: Gastropoda) of Signy Island, South Orkney Islands, with a review of the antarctic and sub-antarctic (excluding southern South America and the New Zealand sub-antarctic islands) species,** *British Antarctic Survey. Scientific reports,* 1983 No.108, 96p., 47 refs.

There are 15 valid species of Eatoniellidae from the Antarctic-sub-Antarctic, one of which has two geographic subspecies. Five species of *Eatoniella* are recorded from Signy Island, two being new. Two additional new species are described, one from the Falkland Islands and one from off Enderby Land. Five species of *Onoba* and one of *Powellisetia* are recorded from Signy Island and an additional 20 species of Rissoidae in two genera *(Onoba* and *Powellisetia)* are listed for the rest of the Antarctic-sub-Antarctic. One new species of *Onoba* is described from South Georgia and the Falkland Islands, and another is known only from Marion Island and off Enderby Land. Two new species of *Powellisetia* are described from Îles Kerguelen. Two genera, including three species, of the Barleeidae (subfamily Anabathrinae) are found at Île St. Paul and Île Amsterdam. A third genus, *Fictonoba,* is tentatively recognized from the Burdwood Bank. A new genus and species of Cingulopsidae is described from Signy Island. *Eatoniopsis* is shown to be a junior synonym of *Skenella* and a new species of *Skenella* is described from Signy Island, the Antarctic Peninsula and Terre Adélie. Four additional named Antarctic and sub-Antarctic species of *Skenella* are recognized and two unnamed species are recorded. Two species of Orbitestellidae are known from the region, one from the Davis Sea. A new species of *Rissoella* is described from Signy Island and the two named sub-Antarctic species are reviewed. An analysis of the distribution of the species taxa shows a high degree of endemism, particularly in the sub-Antarctic fauna. (Auth. mod.)

B-29407

Ino, Y., **Estimation of primary production in moss community on East Ongul Island,** *Antarctic record,* Dec. 1983 No.80, p.30-38, In Japanese with English summary. 15 refs.

Measurements were made in January 1982 at Showa Station with an infrared gas analyzer. Three species of mosses, *Ceratodon purpureus, Pottia heimii* and *Bryum pseudotriquetrum* were included in the community. The surface of all moss communities was covered with blue-green algae and lichens, and the growth condition of moss communities looked very poor. Positive correlations were observed between the gross photosynthetic rate or respiration rate and the R-T index, which is the product of daily radiation amount and daily mean air temperature. The net production rates in summer were estimated by the use of meteorological data for 17 years. Mean net production rate of moss community was 3.7 g dw/sq m/yr, and the maximum and the minimum rates were 12.8 and -16.2 g dw/sq m/yr, respectively. (Auth.)

B-29408

Aoyanagi, M., Tamiya, Y., **Note on the feeding behavior of the Adélie penguin,** *Antarctic record,* Dec. 1983 No.80, p.39-46, In English with Japanese summary. 10 refs.

The feeding behavior of Adélie Penguin *Pygoscelis adeliae* was observed from morning till night during the middle crèche stage. Data on the following items are tabulated: 1) feeding frequency of chicks, 2) returning frequency of parents, 3) recognition and utilization of the abandoned nesting territories, and 4) difference of survival rate of chicks and parental care due to brood size.

B-29445

Shankaranarayana Guptha, M.V., **Benthic foraminifera from the continental margin off Queen Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.106-113, 7 refs.

The foraminiferal fauna of the sediments of the continental margin of Queen Maud Land is dominated by planktic foraminifera (more than 90%) while in the benthic foraminifera the calcareous outnumber the arenaceous. The richness of the benthic foraminifera (812 to less than 100 per gm) and diversity (44 to 5 pieces) decreases from the shelf to the slope. Altogether 59 species of benthic foraminifera along with 14 indetermined species were recorded. The dominant species among the calcareous benthic foraminifera is *Ehrenbergina glabra* and among the arenaceous the *Cyclammina cancellata.* The presence of some shallow water foraminifera such as *Legena* and *Oolina* in deep water is due to ice rafting. The absence of *Uvigerina,* a common genus of the sub-antarctic regions, indicates the lack of faunal mixing from the southern Indian Ocean to the antarctic continental margins. (Auth.)

B-29455

Wafar, S., Untawale, A.G., **Flora of *Dakshin Gangotri* in Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.182-185, 14 refs.

A moss, *Bryum* sp. and a petrophilous lichen, *Acarospora* sp., have been collected at *Dakshin Gangotri,* an unmanned station set up by the First Indian Expedition to Antarctica in January, 1982. Morphological features of the plants are described and illustrated.

B-29456

Prabhu Matondkar, S.G., Gomes, H.R., **Biological studies on the ice shelf and in freshwater lakes at Princess Astrid Coast, Dronning Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.186-190, 11 refs.

Biotic and environmental characteristics of four freshwater lakes in the mountainous *Dakshin Gangotri* (Lat. 70 45 12 S; long. 11 38 12 E) are reported. The lakes are truly limnetic with little or no floating ice. Waters are highly turbid, thus impeding the passage of sunlight in the subsurface region. Water temperature varies within a narrow range of 0 to +2 C as against the wide fluctuations of air temperature. While the essential nutrient salts of nitrogen and phosphorus are low, the silicates are considerably high. The bacterial flora is dominated by *Bacillus, Micrococcus* and *Corynebacterium.* A comparison of data on inorganic salts, POC, ATP, and bacterial counts from the lakes and iceshelves clearly indicates that the antarctic lakes represent a self-contained ecosystem different entirely from the iceshelves. (Auth.)

B-29457

Prabhu Matondkar, S.G., Qasim, S.Z., **Some observations of the biological productivity of antarctic waters,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.191-197, 21 refs.

Observations on chlorophyll *a* particulate organic carbon (POC) and ATP from the antarctic waters showed that the chl *a* concentrations in the inshore waters are not significantly different from those of the open ocean waters of the Antarctic. Vertical distribution of chl *a* is uniform in the euphotic zone. POC concentrations revealed that the area studied is fertile and there is regular input of organic material into the water column. A direct relationship was found between the bacterial counts and ATP content. A significant part of POC appears to exist as detritus, probably of phytoplankton and bacterioplankton origin. Primary production ranged from 0.021 to 9.95 mgC/cu m/day. The average rate of fixation of particulate carbon was 3.72 mgC/cu m/day in the inshore waters and 0.95 mgC/cu m/day in the open ocean waters. The areas with pack ice gave a production rate of 2.65 mgC/cu m/day. Size fractionation showed that nannoplankton (<20 micron) organisms form a very important component of phytoplankton. The data obtained are discussed in relation to the season of observation and the availability of nutrients in the area of study. (Auth.)

B-29458

Goes, J.L., Devassy, V.P., **Phytoplankton organisms collected during the First Indian Antarctic Expedition,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.198-201, 15 refs.

28 species belonging to 23 genera were recorded as components of the phytoplankton population collected during the First Indian Antarctic Expedition. Diatoms were represented by 27 species belonging to 20 genera and were distinctly the abundant forms at stations near the ice edge. Dinoflagellates and silicoflagellates were poorly represented. Away from ice edge the cocolithophores appeared in large numbers, however, most of the individual cells were too small and ill-defined for species identification. (Auth.)

B-29459

Goswami, S.C., **Zooplankton of the antarctic waters,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.202-212, 19 refs.

Distribution, abundance and diel variation in zooplankton were studied in antarctic waters. Zooplankton biomass values ranged from 14 to 624 ml/1000 cu m. High standard stock values (average 284 ml/1000 cu m) were recorded in the Antarctic Convergence where radiolarians and euphausids were the dominant taxa. Copepoda, Amphipoda and Chaetognatha formed the major constituents of zooplankton community in the Polar Divergence and Subtropical Convergence. Salinity fluctuations were not much (33.59 to 35.16%). Temperature variations (-0.33 to 16.66 C) were the important factor influencing the geographic distribution of the species investigated. The species diversity values were low and showed inverse relationship with biomass. No appreciable nocturnal abundance of biomass and zooplankton species was observed. (Auth.)

B-29460

Parulekar, A.H., Ansari, Z.A., Harkantra, S.N., **Benthic fauna of the antarctic ocean—quantitative aspects,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.213-218, 17 refs.

Quantitative studies on the macro and meiobenthos of the less explored (between 11 and 41 E longitude) part of the Indian Ocean sector of antarctic ocean, revealed the existence of rich fauna and high standing crop in the depth range of 200 to 3600 m. Population density contributed by 12 meiofaunal and 3 macrofaunal taxa, was of a high magnitude and variety. Nematodes (64.20%) and polychaetes (53.-33%) were dominant components of meio and macrofauna, respectively. Meiofauna was more abundant in sandy sediments than in clayey bottom deposits and the richness of fauna showed positive correlation with increasing depth. In contrast, the macrofauna showed decreasing abundance with increasing depth. Ratio of macro to meiofauna in the total population was 1 to 53. Benthic standing crop was exceptionally high at shallow depths, decreasing with increasing depths. Macrofauna contributed almost 99% to the total benthic biomass and the contribution of macro and meiofauna was in the ratio of 675 to 1. High benthic biomass and varied fauna is a consequence of high biological productivity during the antarctic summer. Results are discussed with environmental relevance to comparable antarctic marine ecosystems reported by earlier workers. (Auth.)

B-29461

Verlencar, X.N., Singbal, S.Y.S., Parulekar, A.H., **Biochemical components of the benthic regions in antarctic waters,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.219-223, 26 refs.

Biochemical composition of the antarctic shelf and deep sea sediments was studied. The carbon, nitrogen and phosphorus content was found to vary from 2.42 to 10.7, 1.06 to 2.68 and 0.11 to 0.43 mg/g dry weight, respectively. The values obtained are comparable to those found in some regions of Pacific Ocean and the Arabian Sea. Rich planktonic fauna in the overlying waters as well as the deposits from the glacial materials seem to be responsible for the fluctuation of the carbohydrate content of the organic matter. However, benthic biomass does not seem to be much related to the organic content of the sediments. (Auth.)

B-29462

Parulekar, A.H., **Sea birds and marine mammals of the First Indian Antarctic Expedition (1981-82),** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.224-231, 16 refs.

Thirteen species of sea birds and five species of marine mammals observed in Antarctica and the subantarctic region are reported. Occurrence, population, geographic distribution and behavior of the animals are discussed.

B-29463

Wharton, R.A., Jr., **Ecology of algal mats and their role in the formation of stromatolites in Antarctic dry valley lakes,** Blacksburg, Virginia Polytechnic Institute and State University, 1982, 119p., University Microfilms order No.82-26912, Ph.D. thesis. Refs. p.104-114.

Algal mats comprised primarily of *Phormidium frigidum* Fritsch, *Lyngbya martensiana* Menegh., and several species of pennate diatoms are found in the below-ice benthic regions of antarctic lakes. Variations in temperature, light, oxygen, salinity, and nutrient levels between lakes and different habitats in the same lake result in differences in species composition, morphology, biomass, and photosynthetic pigment content of the mats. Algal mats are trapping and binding sediment, and precipitating minerals, particularly calcite. Mats are removing organic and inorganic matter from the arheic lakes via transfer through the ice-covers or by incorporation into the sediments. Some of the algal mats are laminated, organosedimentary structures and can be considered stromatolitic. Depending upon ambient and subsequent environmental conditions non-columnar, columnar, and pinnacle-shaped stromatolites are forming, some of which are partially lithified. If environmental variables (i.e. low light intensity, lack of burrowers or browsers, and relative lack of turbulence) associated with these stromatolites do not vary significantly, it is probable that they may result in a lacustrine carbonate sedimentary deposit. (Auth.)

B-29465

Stockton, W.L., **Biology and ecology of the epifaunal scallop *Adamussium colbecki* on the west side of McMurdo Sound, Antarctica,** *Marine biology,* 1984 78(2), p.171-178, 28 refs.

The biology and ecology of the Antarctic scallop *Adamussium colbecki* has been investigated on the west side of McMurdo Sound principally at Explorers Cove, during the austral summer of 1981-1982. This conspicuous benthic invertebrate exhibits highest densities, 85 individuals/sq m in shallow (4 to 6 m) water. Densities decrease to 20/sq m at 30 m. Biomass levels are highest in shallow water, 1600 g wet/sq m. Provisional growth information suggests that 8 cm individuals are about 12 yrs old. Mortality is apparently caused chiefly by a hyposaline lens of seawater, which forms under the sea ice during the summer melt; predators do not appear to be important. High biomass levels and a short generation time suggest that *A. colbecki* is an important species in a very productive community on the west side of McMurdo Sound. The shallow benthos of Explorers Cove is an important exception to the generalization that antarctic ecosystems are dominated by indigestible filter-feeders. (Auth.)

B-29466

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol. 5, No. 2,** College Station, Texas A&M University, 1983, 12p.

The fourth SCAR symposium on antarctic biology, held in Wilderness, South Africa, between Sept. 12 and 16, 1983—with the chosen theme of "Nutrient cycles and food chains"—is reported. A chart, *The Organizational Structure for BIOMASS Programs* is shown, specifying each group's activity and listing the names of its members. News on the BIOMASS Data Center are given, covering analytical computing facilities, data management, funds for, and possible locations of, the Center. The British Antarctic Survey winter cruise is described, and an announcement is made that South Africa's *Africana* is to join the SIBEX fleet. There is a notice of the publication of Polish FIBEX results in a Polish Polar Research issue, with titles of articles included.

B-29477

Gromov, V.V., Tolkach, V.V., **Uptake of Sr-90 and Y-90 by antarctic krill,** *Ocean science and engineering,* 1983 8(3), p.287-297, 11 refs.

The kinetics of accumulation and release of radionuclides by antarctic krill are discussed. Sr-90 and Y-90 concentration factors under natural conditions were determined for krill of different ages. It was found that uptake of Sr-90 and Y-90 is a function of the volume or mass of the feeding organism. Experimental results have shown that adsorption is the main mechanism of Y-90 accumulation, but Sr-90 is captured by krill generally during feeding. Process of Sr-90 concentration has been shown to last for about 2 days. (Auth.)

B-29483

Tradatti, C.E., Badran, A.F., Busatto, D., **Biological antifreezes in *Harpagifer antarcticus*** [Anticongelantes biológicos en *Harpagifer antarcticus*], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.301, 9p., In Spanish with English, French and German summaries. 15 refs.

The presence of noncolligative biological antifreezes in the plasma of some antarctic fishes of the family Notothenidae has been proved. The presence of this type of substance in the plasma of the *Harpagifer antarcticus* is studied in this paper. The *Harpagifer antarcticus* belongs to the family Harpagiferidae which, together with the Notothenidae, integrates the suborder Notothenioidea. The technique used for the measurement of the cryoscopic depression of of plasmas is that described by DeVries. The presence of macrocellular, noncolligative biological antifreezes, soluble in trichloracetic acid is proved and their probable similarity with those present in the other family is discussed. (Auth.)

B-29488

Von den Steinen, K., **Zoological observations, Royal Bay, South Georgia 1882-1883. Part 1,** *Polar record,* Jan. 1984 22(136), p.57-71, Translation by William Barr of Allgemeines über die zoologische Thätigkeit und Beobachtungen über das Leben der Robben und Vögel auf Süd-Georgien. In G. Neumayer (ed), Die internationale Polarforschung 1882-83. Die deutschen Expeditionen und ihre Ergebnisse, Band II. Beschreibende Naturwissenschaften in einzelnen Abhandlungen, etc., Berlin, Asher:194-227, 1890. 4 refs.

DLC 4G.399

The German Expedition team remained on South Georgia for a year pursuing its main observation programs in meteorology, magnetism, and aurora. Von den Steinen was the medical officer for the group, and a trained zoologist. This part of the report deals with remarks on the general environment of South Georgia, its land and sea animals, and the seals. Collection methods for the invertebrate beach fauna are described, such as low tide, seaweed, surface collecting, and trawling with D- and Delta-shaped nets, and specimens are identified. Brief general remarks of observed bird species are made. More detailed descriptions are given of the fur, leopard, and elephant seals with regard to physical and behavioral characteristics.

B-29497

McConville, M.J., Wetherbee, R., **Bottom-ice microalgal community from annual ice in the inshore waters of East Antarctica,** *Phycology,* Dec. 1983 19(4), p.431-439, 37 refs.

The structure, productivity and heterotrophic potential of an extensive microalgal community growing on the underside of sea ice near Casey Station are described. Underwater observations made near Davis and Mawson stations are also reported. This community develops during September, is largely suspended from the bottom surface of annual sea ice and often extends into the underlying wate column as conspicuous strands up to 15 cm long. Unlike previousl described bottom ice environments, a brash ice layer under the har sea ice is absent. Living cells, predominantly *Nitzschia frigida* Gru now, also occur in microbrine channels in the bottom 3 cm of the ice Maximal primary production occurred during Nov., then began declining near the end of Dec. Minimal rates were reached in mid January and coincided with changes in the physical structure of th sea ice and in the stability of the water column. Turnover times o assimilated amino acids in the bottom ice community averaged 55 during Nov. while negligible turnover of these substrates occurred i the water column 1.5 m below the ice. These bottom ice communities have higher primary productivity than typical brash ice communities; they are also accessible to marine herbivores and so may be mor important to the Antarctic marine food chain than previousl supposed. (Auth.)

B-29498

Seaburg, K.G., Kaspar, M., Parker, B.C., **Photosynthetic quantum efficiencies of phytoplankton from perennially ic covered antarctic lakes,** *Phycology,* Dec. 1983 19(4), p.446-452, 38 refs.

A recently introduced approach for estimating the photosyntheti quantum efficiency of a freshwater or marine phytoplankton community has been applied for the first time to high latitude polar ecosystems, namely four lakes of southern Victoria Land. Values at variou depths ranged from 0.0022-0.1560 when calculated using a recommended mean extinction coefficient for phytoplankton. Result show that the phytoplankton of these Antarctic lakes are well adapte to performing photosynthesis under extremely low light condition (Auth.)

B-29499

Davis, R.W., Castellini, M.A., Kooyman, G.L., Maue, R., **Renal glomerular filtration rate and hepatic blood flow during voluntary diving in Weddell seals,** *American journa of physiology,* Nov. 1983 245(5) Part 1, p.R743-R748, 32 refs.

Renal and hepatic function were studied during voluntary dive in Weddell seals by measuring the clearance rate of inulin and indocyanine green (ICG). Inulin is cleared exclusively the the kidney and measures renal glomerular filtration rate (GFR). ICG is cleare by the liver and is blood flow dependent at concentrations use Studies were conducted from a portable hut with a trapdoor place over an isolated hole in the sea ice near McMurdo Station. An intravertebral extradural catheter was inserted percutaneously unde light anethesia in subadult seals weighing 130-200 kg. When release into the ice hole, the seals made voluntary dives, but always had t return to breathe. Serial blood samples were taken after single inje tions of inulin and ICG and analyzed within 24 hr. Inulin and IC clearance rates did not change from resting levels during dives short than the seal's aerobic dive limit (ADL). Inulin clearance decrease over 90% during dives longer than the ADL, but there was no signif cant reduction in ICG clearance during dives lasting up to 23 mi Evidently normal renal GFR and hepatic blood flow continue durin natural aerobic dives. During dives that exceed the ADL, GFR is r duced but hepatic blood flow may be maintained. (Auth.)

B-29500

Discovery of French austral and antarctic lands [A la découverte des Terres Australes et Antarctiques Françaises], Marseille, Museum d'Histoire naturelle, 1983, 49p., In French. 20 refs.

This booklet was published by the Museum of Natural History Marseille for an exhibition on the Antarctic from Dec. 1983 to Marc

1984. It includes numerous photographs and maps of Amsterdam, Saint Paul, Kerguelen and Crozet islands and Terre Adélie, and their flora and fauna, accompanied by explanatory comments. Biological data of land and sea resources are based on review of publications listed at the end.

B-29504

McFadden, G.I., Wetherbee, R., **Serial reconstruction of the mitochondrial reticulum in the antarctic flagellate, *Pyramimontas gelidicola (Prasinophyceae, Chlorophyta)*,** *Protoplasma,* 1982 111(1), p.79-82, 15 refs.

A serial reconstruction of *Pyramimonas gelidicola* McFadden, Moestrup and Wetherbee has revealed a large reticulated mitochondrion branching throughout the cell. The possibility of single mitochondria in other members of the *Prasinophyceae* and the uniformity of the morphology of this organelle within the class is discussed. (Auth.)

B-29505

Matulewicz, C.M., Percival, E.E., Weigel, H., **Water-soluble polysaccharides of antarctic and cultured *Phormidium* species of the Cyanophyceae,** *Phytochemistry,* 1984 23(1), p.103-105, 14 refs.

Hot water extraction of a *Phormidium* species from Antarctica and of a *Phormidium foveolarum* which had been cultured axenically led to the isolation of a water-soluble polysaccharide from both materials. Acidic hydrolysis of each gave a similar pattern of monosaccharides comprising arabinose, xylose, rhamnose, fucose, galactose, mannose and glucose, and both contained uronic acid. All attempts by a variety of methods to fractionate the Antarctic methylation studies on this polysaccharide supported a highly branched molecule with 1.3-linked glucose and 1.4-linked galactose as dominant features. (Auth.)

B-29506

Evans, C.A., O'Reilly, J.E., **Handbook for the measurement of chlorophyll *a* in netplankton and nannoplankton,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS handbook,* 1983 No.9, 44p., 22 refs.

Methods for plankton collection, measurements of chlorophyll *a* in netplankton and nannoplankton, and equipment used, are described. Chlorophyll coding forms, and explanations, are included. A FORTRAN program for data processing is provided.

B-29508

Boone, R.J., Manthey, M., **Anatomical distribution of fluoride within various body segments and organs of antarctic krill *(Euphausia superba* Dana),** *Archiv für Fischereiwissenschaft,* July 1983 34(1), p.81-85, In English with German summary. 9 refs.

Living krill was dissected in various body segments and organs. Freeze-dried samples were analyzed for fluoride anions (micrograms/g dry weight) using a fluoride ion selective electrode. The average fluoride content of whole krill was 1009. Very high concentrations were found in the exoskeleton of the abdomen, 1958, the pleopods, 1777, and in the thoracic limbs, gills, antennules, antennae and mouthparts, 1162. The stomach contained 1202. Concentrations in the hepatopancreas were determined to be a low 8, and in the pleon muscle 70. (Auth.)

B-29510

Christians, O., Leinemann, M., **Protein autolysis in muscle flesh of frozen krill *(Euphausia superba* Dana) in relation to storage temperature after 12 months of storage** [Die Eiweissautolyse im Muskelfleisch von gefriergelagertem antarktischem Krill *(Euphausia superba* Dana) in Abhängigkeit von der Lagertemperatur nach 12-monatiger Lagerung], *Archiv für Fischereiwissenschaft,* July 1983 34(1), p.97-102, In German with English summary. 6 refs.

The contents of soluble nitrogen of raw krill and of centrifuged raw krill, which was released from its body fluids, increases with storage temperature from -40 C to -10 C. The degree of autolysis is not only influenced by storage temperature but also by the preceding preparation. After thawing the autolysis starts with a fairly high intensity irrespective of the preceding deep-freezing storage temperature. By steaming before deep-freezing the autolysis is almost prevented. These results show, with regard to subsequent processing ashore, that after catching it is necessary either to inactivate the proteases immediately or to produce clean krill meat by peeling. (Auth.)

B-29511

Winston, J.E., **Patterns of growth, reproduction and mortality in bryozoans from the Ross Sea, Antarctica,** *Bulletin of marine science,* July 1983 33(3), p.688-702, 52 refs.

Colonies of bryozoans are large and numerous enough to be apparent in underwater photographs taken in shelf environments throughout the Ross Sea. Analysis of preserved specimens from ber[illegible] samples showed that two abundant groups had contrasting life history patterns. The branching colonies of the cellarinellids occurred in clumps or thickets. Sexual reproduction appeared to play a small role in their biology partly because zooids in proximal regions became senescent and unable to feed or reproduce. Instead cellarinellids have maximized the ability to reproduce asexually via fragmentation. Colonies suffered a large amount of partial mortality due to injury by microborers or activities of motile benthos. Broken distal ends of branches were, however, regenerated, while fallen fragments produced new attachment rootlets, and altered their direction of growth. (Auth. mod.)

B-29513

Buck, K.R., Garrison, D.L., **Protists from the ice-edge region of the Weddell Sea,** *Deep-sea research,* Dec. 1983 30(12A), p.1261-1277, 49 refs.

We present some of the first records and quantitative data on protists from the ice-edge region of the Weddell Sea. Major groups were diatoms (33 species), dinoflagellates (4 species), prymnesiophytes (2 species), cryptomonads (2 species), prasinophytes (1 species), chrysophytes (3 species), and choanoflagellates (11 species). The prymnesiophyte, *Phaeocystis pouchetii,* diatoms, predominantly *Nitzschia* of the Fragilariopsis group, and choanoflagellates were numerically dominant, although other protists sometimes contributed significantly to plankton populations. Most groups were more abundant at the ice edge than under the pack ice or in the open water. The abundance of choanoflagellates suggests that food chains based on bacterial production must be important, as well as the traditional diatom-krill-vertebrate food chain. (Auth.)

B-29515

Kerley, G.I.H., **Comparison of seasonal haul-out patterns of fur seals *Arctocephalus tropicalis* and *A. gazella* on subantarctic Marion Island,** *South African journal of wildlife research,* Sep. 1983 13(3), p.71-77, In English with Afrikaans summary. 20 refs.

The seasonal haul-out patterns of *Arctocephalus tropicalis* and *A. gazella* were determined by regular counts of seals at breeding colony beaches on Marion Island during the 1980/81 and 1981/82 austral summers. Both species showed similar patterns with summer (breeding) and autumn (moulting) peaks in numbers ashore in December and March respectively. The *A. gazella* haul-out was before that of *A. tropicalis* with an earlier calculated median date of birth. *A. gazella* pups were weaned earlier than *A. tropicalis* pups. The differences in the seasonal cycle between the two species are not sufficient to prevent hybridization as their breeding periods overlap. *A. tropicalis* males were already hauled out by the time *A. gazella* females came ashore to give birth before going into a postpartum oestrus. (Auth.)

B-29516

Bester, M.N., Kerley, G.I.H., **Rearing of twin pups to weaning by subantarctic fur seal *Arctocephalus tropicalis* female,** *South African journal of wildlife research,* Sep. 1983 13(3), p.86-87, In English with Afrikaans summary. 11 refs.

An *A. tropicalis* female was recorded rearing two pups to weaning. Circumstances indicate that these were twins. This is the first documented case of an otariid female successfully weaning twins in the wild.

B-29595

Ward, B.L., **Benthic foraminifera of McMurdo Sound,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.407-409, 11 refs.

DLC QE350.A57 1983

Sediment samples containing foraminifera have been collected in McMurdo Sound from a range of water depths and physiographic situations, using the sea ice as an operating platform. Splits were treated with rose bengal stain, and tests containing stained protoplasm extracted for further study. Nonstained tests were also separated for comparative purposes. Three areas of varying foraminiferal distribution have been identified as follows: 1) below 560 m there exists an assemblage of agglutinated foraminifera with *Reophax* spp. as the dominant taxa; 2) between 560 and about 210 m there is a mixed assemblage, again with *Reophax* spp. as the dominant agglutinated taxa, and *Trifarina earlandi, Globocassidulina* cf. *Subglobosa* and *Cassidulinoides porrectus* as the dominant calcareous taxa; this includes the Granite Harbour area; and 3) the New Harbour area supports an agglutinated population similar to that found below 560 m in the open Sound. Comparison of living (stained) and dead assemblages from the top 20 mm of five 22 cm-diameter cores indicates that post-mortem alteration of assemblages, specifically, disappearance of calcareous tests, increases progressively with greater water depth until the carbonate compensation depth (CCD) is reached, somewhere between 560 and 850 m. (Auth.)

B-29655

Andriiashev, A.P., Gruzov, E.N., **Results from biological investigations in the southern ocean during 25 years** [Rezul'taty biologicheskikh issledovaniĭ v IUzhnom okeane za 25 let], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.111-118, In Russian.

Marine biological investigations in the Antarctic, covering a period of 25 years, are briefly described. Faunal data collection, started during the first three Soviet antarctic expeditions (1955-1958), continued over the following years with the participation of over 60 Soviet scientists. The data obtained allowed the expansion on the subject in directions such as methodology, ecology and biogeography of the World Ocean's fauna.

B-29661

Hamner, W.M., **Krill—untapped bounty from the sea,** *National geographic magazine,* May 1984 165(5), p.627-643.

Results of krill observations made during a cruise aboard *Hero* along the northern Antarctic Peninsula coasts is given. In an overview the status of krill is described in general terms and touches on: physical appearance, population, distribution, prey/predator relationships, feeding, swimming, swarming, and escaping behaviors, reproduction and growth, and exploitation. Other krill varieties in other parts of the world are noted, uses made of krill by man are told, and some of the successes and failures in krill exploitation by man are mentioned. A series of photographs by F. Nicklin augments the text.

B-29664

Siegel, V., **Investigations on krill *(Euphausia superba)* in the southern Weddell Sea,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(4), p.244-252, In English with German summary. 10 refs.

In the season 1979/80 and 1980/81 krill investigations were carried out in the southern Weddell Sea. The distribution and abundance of *Euphausia superba* varied in different parts of the Weddell Sea. Differences in population structure and spawning time were identified by comparing hauls taken simultaneously from the Bransfield Strait and the East Wind Drift area of the Weddell Sea. A biomass of 2.91 t/square nautical mile net weight was calculated for a limited area of the East Wind Drift. (Auth.)

B-29665

Hempel, I., Hempel, G., **Distribution of euphausiid larvae in the southern Weddell Sea,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(4), p.253-266, In English with German summary. 11 refs.

Plankton samples taken in January/February 1980 and 1981 in the inner Weddell Sea and the area off Cape Norwegia—Atka Bay contained larvae of *Thysanoessa macrura, Euphausia superba* and *Euphausia crystallorophias.* The highest numbers of all species were found in the divergence zone south of Cape Norwegia. *Thysanoessa macrura* had here the southern boundary of its main area of distribution, while *E. superba* larvae extended southward to the Filchner Depression. *E. crystallorophias* was the only euphausiid species which occupied the entire shelf of the southern Weddell Sea from Cape Norwegia to the Antarctic Peninsula. *E. crystallorophias* larvae were also found beyond the shelf break off Atka Bay. In general the distribution of larvae differed only little from that of the adults. Larvae of *Thysanoessa macrura* occurred earliest in the season, followed by *E. crystallorophias* and later by *E. superba.* The larval development of *Euphausia crystallorophias* from naupliar and early calyptopis stage to early furciliae took up to six weeks. (Auth.)

B-29671

Kawano, M., Inoue, T., Hidaka, H., Tatsukawa, R., **Chlordane compounds residues in Weddell seals *(Leptonychotes weddelli)* from the Antarctic,** *Chemosphere,* 1984 13(1), p.95-100, 29 refs.

Weddell seal samples taken from the Antarctic have been found to be contaminated with chlordane compounds. They were present in blubber of seals at the range of 12-62 ng/g fresh weight. The order of chlordane compound concentrations was trans-nonachlor > oxychlordane > cis-nonachlor > cis-chlordane. Relative aboundance of cis-chlordane is higher than in humans. A probable explanation for their occurrence in the Antarctic is an airborne transport. (Auth.)

B-29674

Baust, J.G., Lee, R.E., Jr., **Population differences in antifreeze/cryoprotectant accumulation patterns in an antarctic insect,** *Oikos,* Jan. 1983 40(1), p.120-124, With Russian summary. 19 refs.

The freezing tolerant antarctic midge *Belgica antarctica* Jacobs accumulates a 3 component cryoprotectant system during the period of seasonal transition (Feb.-March). Separate populations produce qualitatively identical cryoprotectants (erythritol, glucose and trehalose), but with quantitative variations that may yield a doubling in levels of 1 or more individual cryoprotectants. These quantitative variations occur under identical thermal and photic conditions. The protective potential of cryoprotectants when represented as a combined indicator of concentration (hydroxyl equivalents) is essentially equal among populations as hardening is maximized. Supercooling points elevate from austral summer lows of -10.2 deg to winter highs of -5.0 deg C. The accumulation of cryoprotectants occurs concomitantly with the gradual decrease in microhabitat temperatures (0.20 deg-0.25 deg C/day). Enhanced hardening is probably not alone triggered by temperature, but may be associated with other environmental stressors or development programming. (Auth.)

B-29675

Usher, M.B., **Pattern in the simple moss-turf communities of the subantarctic and maritime Antarctic,** *Journal of ecology,* Nov. 1983 71(3), p.945-958, 16 refs.

Grids of 1500 (300 x 5) 2 x 2 cm quadrats have been recorded on three moss-turf sites: South Georgia in the Sub-Antarctic (three dominant species), and in the maritime Antarctic on Signy Island (two dominant species), and on Galindez Island (a virtual monoculture of *Polytrichum alpestre).* At Signy Island there is a well developed pattern, with two scales of heterogeneity at about 20 cm and at 1.2-2.0 m. The latter is considered to be due to the history of vegetation development, which is determined by the distribution of rocks now beneath the surface of the moss carpet. The South Georgia community has two scales of pattern similar to those on Signy Island, but the factors determining them are unknown. In this three-species community both positive and negative associations are indicated. On all sites, virtually all analyses indicated a small scale of pattern at about 20 cm. It is considered that this scale is important when sampling both the vegetation and the animal communities living within the moss-turf communities. (Auth.)

B-29676

Clark, C.W., **Economic aspects of renewable resource exploitation as applied to marine mammals,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.7-19, With French and Spanish summaries. 8 refs.

DLC QL713.2.F66

This paper deals with the various economic aspects of marine mammal exploitation. A simple Gordon-Schaefer bio-economic model of the Antarctic fishery for blue whales *(Balaenoptera musculus)* is used to illustrate the usual course of exploitation of common-property resources.

B-29677

Gulland, J.A., **Note on the strategy of the management of marine mammals,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.93-102, With French and Spanish summaries. 6 refs.

DLC QL713.2.F66

This note discusses the medium-term strategies that might be pursued in managing marine mammals. Any such strategy must take into account *inter alia* the uncertainties in the estimates of population parameters (abundance, mortality rates, etc.), possible long-term changes in human priorities (e.g., the possible direct use of krill), and the desirability for year-to year changes in regulations (e.g., catch quotas) to be reasonably small so as to allow those affected, especially the industry, to be able to adjust their operation. Management policies should also be formulated so that the events of the fishery provide as much additional information on the stock, so as to provide better estimates of the optimum population level and sustainable catch. It is suggested that present policies are not likely to satisfy these criteria, and alternative strategies are proposed.

B-29678

Ichihara, T., **Review of pygmy blue whale stock in the Antarctic,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.211-218, With French and Spanish summaries. 20 refs.

DLC QL713.2.F66

Pygmy blue whales were not identified until 1961 as a population separate from ordinary blue whales, *Balaenoptera musculus,* differing from the latter in the following characteristics: body proportion, shape of baleen plate, growth (smaller lengths at sexual and physical maturity and when full grown) and migratory range and sub-population. The 3 former characteristics together with additional distinctive osteological information, indicate that the pygmy blue whale is a new subspecies, *B. brevicauda,* as proposed by Ichihara in 1963 (publ. 1966). A selective harvest of pygmy blue whales is practically impossible due to an absence of distinguishing features observable at sea. Inadequate data prevents calculation of reproductive and mortality parameters.

B-29679

Gulland, J.A., **Note on the abundance of antarctic blue whales,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.219-228, With French and Spanish summaries. 4 refs.

DLC QL713.2.F66

The methods used to estimate the relative or absolute abundance of antarctic blue whales are discussed. These include catches per unit effort, sightings and marking. While no single method is satisfactory, there is a broad agreement between different methods, suggesting a total exploitable stock in 1963 of around 4,000 blue whales. Possible changes since the cessation of commercial hunting in 1963 are discussed. The only information comes from sightings from survey vessels, which are not sufficient to detect small rates of increase. Information on the likely values of the natural parameters suggests that the population may be increasing at 4-5 percent per year. The total population of blue whales in the southern ocean (including juveniles and pygmy blue whales) may be around 10,000 animals.

B-29680

Gambell, R., **Population assessments of antarctic fin whales,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.229-248, With French and Spanish summaries. 44 refs.

DLC QL713.2.F66

Methods for determining the movements and stock units of fin whales, *Balaenoptera physalus,* in the Southern Hemisphere are examined. The methods for estimating the population size of *B. physalus* in the Southern Hemisphere and associated problems and modifications are also reviewed. Pre-season estimates of the total antarctic fin whale populations were agreed upon in 1970 by the Scientific

Committee of the IWC as 171,800 animals in 1957/58 and 100,500 animals in 1961/62. The IWC Scientific Committee has agreed on a current population estimate of about 83,000-84,000 for antarctic fin whales. Recent sharp declines in fin whale stock indices in Antarctic Areas IV and III are not consistent with the model being used and suggest a need to revise the estimates. In classifying southern fin whales under the IWC's new management policy, the size of the Antarctic population before whaling was given to be 400,000 animals, reduced to a current size of 80,500; the MSY was taken to be 8,080, produced from a population of 227,000 whales.

B-29681

Gambell, R., **Review of population assessments of southern minke whales,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.249-257, With French and Spanish summaries. 22 refs.

DLC QL713.2.F66

The antarctic fishery for minke whales, *Balaenoptera acutorostrata* is a newly developed enterprise providing little information on which firm population assessments can be based. Size estimates of the antarctic population of this species made in the early seventies and associated population models and figured MSY are reviewed, with assessments ranging from an initial population of 299,000 with an MSY of 12,230 whales at a population size of 158,500, to an initial mature population of about 204,000 with an MSY of 5,000 at a population size of 122,400. These estimates take inadequate account of factors affecting catching effort. It is possible that southern minke whales were increasing in number when exploitation of them began, because of the effects of earlier reductions of larger balaenopterids.

B-29682

Tranter, D.J., **Antarctic arguments and options,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.359-361, With French and Spanish summaries. 11 refs.

DLC QL713.2.F66

There are two different interpretations of the possibilities of exploitation of living resources in the Antarctic, both based on the assumption that there exists there a biocenosis depending on krill abundance and already changed through the reduction of baleen whale stocks by man. One proposition states that an equilibrium can be reached allowing the recovery of the whale stocks and the sustained harvesting of them and krill. The other proposition states that krill harvesting and competition from other species may prevent the recovery of some stocks of whales. A comparison of management options based on this second argument indicates that a harvest of whales and krill, the option most likely to occur, is the one least likely to maximize renewable yield.

B-29683

Horwood, J.W., **On the joint exploitation of krill and whales,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.363-368, With French and Spanish summaries. 5 refs.

DLC QL713.2.F66

A simple model of the joint exploitation of krill, *Euphausia superba,* and baleen whales in the Antarctic where the whales feed on the krill, is constructed, using different equations of logistic growth functions and constant predation and reproductive rates. It is shown that whales decrease in abundance with exploitation of krill but not so much as when the whales are harvested directly and that, to a far lesser extent, krill yields are reduced by the presence of whales. With a maximum fishing mortality rate of krill of 0.3, the total yield in weight is greatest when whales have been exterminated and only krill is harvested, if whales are ten times more valuable than krill, the yield is greatest when mostly krill are harvested but whales are allowed to persist and, if whales are worth 100 times more than krill, when a substantial harvest of whales is taken. Thus, there may be a conflict of interest between separate fisheries for krill and whales and it would be best if they were managed together.

B-29684

Lockyer, C., **Growth and energy budgets of large baleen whales from the Southern Hemisphere,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1981 Vol.3, Mammals in the seas. Vol. 3. General papers and large cetaceans, p.379-487, With French and Spanish summaries. Refs. p.476-484.

DLC QL713.2.F66

There are five balaenopterid species which frequent the antarctic ocean for a few months each year. These are the blue, *Balaenoptera musculus,* the fin, *B. physalus,* the sei, *B. borealis,* the minke, *B. acutorostrata,* and the humpback, *Megaptera novaeangliae.* The growth, development, migration, seasonal feeding and fattening, metabolism and energy budgets for blue and fin whales are discussed in detail, and comparisons with the sei, minke and humpback whales are made whenever data are available. It is hoped that this study will be a useful lead into more complex analyses of the antarctic marine ecosystem which are needed for evaluating fishery resources, particularly krill, in the southern ocean.

B-29685

Fedorov, V.V., Balushkin, A.V., **First finding of a representative of the family Cetomimidae, *Gyrinomimus notius* sp. n. (Osteichthyes, Cetomimiformes) in antarctic waters** [Pervoe nakhozhdenie v vodakh Antarktiki predstavitelia semeĭstva Cetomimidae—*Gyrinomimus notius* sp. n. (Osteichthyes, Cetomimiformes)], *Zoologicheskiĭ zhurnal,* 1983 62(5), p.737-747, In Russian with English summary. 10 refs.

Gyrinomimus notius sp. n., a representative of the family Cetomimidae, a rare fish of the bathypelagic zone, is described from the Ross Sea. It was caught at a depth of 445-470 m (length 173.6 mm, male). It differs from the other species of the genus by greater number of rows of teeth, presence of luminescent tissue in posterior body half above the lateral line, longitudinal cutaneous folds along the back and abdomen, and fin formula. (Auth.)

B-29686

Batytskaia, L.V., Shurunov, N.A., **Distribution of sea birds in the Antarctic in connection with water masses in summer** [Raspredelenie morskikh ptits v Antarktike v sviazi s razmeshcheniem vodnykh mass v letniĭ period], *Zoologicheskiĭ zhurnal,* 1983 62(5), p.755-760, In Russian with English summary. 10 refs.

The distribution of sea birds in the Pacific and Indian sectors of the Antarctic, by the data from 1871 and hourly registrations carried out in Jan.-March 1981, is considered. Four modifications of surface water masses to the south of the Antarctic Convergence are distinguished by temperature and salinity. The composition of species was found to be specific for each water mass. The albatross, Antarctic petrel, southern fulmar and snow petrel *(Diomedea exulans, Fulmarus glacialis, Pterodroma lessoni* and *P. inexpectata)* have the greatest preference for definite water masses. (Auth.)

B-29687
Kozlov, A.N., **Relationship between intensity and periods of protein increase and fat accumulation in the marbled notothenia, *Notothenia rossi marmorata* (Nototheniidae),** *Journal of ichthyology,* 1981 21(5), p.99-102, Translated from Voprosy ikhtiologii. 6 refs.

Peculiarities of the processes of metabolism in *Notothenia rossi marmorata* were studied. A relationship is noted between the proportion of protein increase and fat accumulation in the body.

B-29688
Parin, N.V., Svetlov, M.F., ***Scopelosaurus hamiltoni* (Notosudidae) in the Scotia Sea,** *Journal of ichthyology,* 1981 21(5), p.113-114, Translated from Voprosy ikhtiologii. 7 refs.

The catch of a sexually immature *Scopelosaurus hamiltoni* female 216 mm long, in Scotia Sea, is reported. Catches recorded south of the Antarctic Convergence of adult species are reviewed.

B-29689
Imber, M.J., **Lesser petrels of Antipodes Islands, with notes from Prince Edward and Gough Islands,** *Notornis,* Dec. 1983 30(4), p.283-298, 39 refs.

In 1978 at Antipodes Islands, breeding was confirmed and distribution of breeding sites was investigated for Snares Cape Pigeons, Subantarctic Fairy Prions, Soft-plumaged Petrels, Subantarctic Little Shearwaters, and Grey-backed Storm Petrels. Breeding seasons, habits and habitats at Antipodes Islands of petrels not exceeding White-chinned Petrels in size are described. Notes are included from Prince Edward and Gough Islands on some of these species studied in 1979. (Auth.)

B-29690
Harper, P.C., **Prion picture puzzle from the South Atlantic,** *Notornis,* Dec. 1983 30(4), p.344-348, 3 refs.

Four photographs of Antarctic Prion in flight near Bouvet Island, with accompanying comments regarding the bird's morphological Characteristics, are presented.

B-29691
Bonner, W.N., **Antarctic (Kerguelen) fur seal,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1979 Vol.2, Mammals in the seas. Vol. 2. Pinniped species summaries and report on sirenians, p.49-51, 20 refs.

DLC QL713.2.F66

The article offers data on vital parameters, trophic relationships, relation to man and threat to stock of the antarctic fur seal. Recommendations for future research are included.

B-29692
Bonner, W.N., **Subantarctic fur seal,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1979 Vol.2, Mammals in the seas. Vol. 2. Pinniped species summaries and report on sirenians, p.52-54, 12 refs.

DLC QL713.2.F66

The article offers data on vital parameters, trophic relationships, relation to man and threat to stock of the subantarctic fur seal. Recommendations for future research are included.

B-29693
Laws, R.M., Hofman, R.J., **Ross seal,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1979 Vol.2, Mammals in the seas. Vol.2. Pinniped species summaries and report on sirenians, p.120-124, Refs. p.122-124.

DLC QL713.2.F66

The article offers data on vital parameters, trophic relationships, relation to man and threat to stock of the Ross seal. Recommendations for future research are included.

B-29694
De Master, D.P., **Weddell seal,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1979 Vol.2, Mammals in the seas. Vol. 2. Pinniped species summaries and report on sirenians, p.130-134, Refs. p.132-134.

DLC QL713.2.F66

The article offers data on vital parameters, trophic relationships, relation to man and threat to stocks of the Weddell seal. Recommendations for future research are included.

B-29700
Drescher, H.-E., **Antarctic marine ecosystem: its conservation and exploitation** [Das antarktische marine Ökosystem: sein Schutz und seine Nutzung], *Geographische Rundschau,* Mar. 1983 35(3), p.123-125, In German.

Predominant species in the food chain are listed from phytoplankton to krill to the warm-blooded whales, seals and birds. Krill are described and their special adaptations for and problems with survival are mentioned. The 19th and 20th century whaling and sealing operations are briefly outlined and efforts to properly manage and conserve the antarctic living resources are discussed.

B-29706
Moore, P.G., Myers, A.A., **Revision of the *Haplocheira* group of genera (Amphipoda: Aoridae),** *Linnean Society of London. Zoological journal,* Oct. 1983 79(2), p.179-221, 40 refs.

The Southern Hemisphere aorid amphipod genera *Haplocheira* Haswell and *Kuphocheira* Barnard are revised and *Anonychocheirus* gen. nov. is described from Antarctica. A key is provided to distinguish the three genera and six species currently known. Material attributed to *H. barbimana* from Antarctica, South Georgia, Australia, Iles de Kerguelen, New Zealand and Auckland Island has been re-examined. The Antarctic material proves to be separate on the basis of antennal peduncle proportions, shape of lateral cephalic angle and shape and setation of peraeopod bases. The species *plumosa* is re-established for this entity. *Haplocheira robusta* Barnard is synonymized with *H. barbimana* and three subspecies are described. *Haplocheira balsii* Schellenberg remains a separate species. *Kuphocheira setimanus* Barnard is re-assessed and *K. emancipata* sp. nov. described from Antarctica. The new genus *Anonychocheirus* is presently known only from the type species *A. richardsoni* sp. nov. described herein. (Auth.)

B-29709
Zilanov, V.K., **Convention on the Conservation of Antarctic Marine Living Resources in action** [Konventsiia o sokhranenii morskikh zhivykh resursov Antarktiki v deĭstvii], *Rybnoe khoziaĭstvo,* 1983 No.1, p.24-27, In Russian.

Principles of the April 1982 Convention, and a report on the first session of the International Commission for the Conservation of Antarctic Marine Living Resources, are presented. The second session of the Commission is reported to be planned for the fall of 1983.

B-29710

Arnaud, P.M., **Discovery of four new stocks of Lithodids (Crustacea: Anomura) in southwestern Indian Ocean** [Découverte de quatre nouveaux stocks de Lithodidae (Crustacea: Anomura) dans le SW de l'Océan Indien], *Téthys,* 1982 10(4), p.390-391, In French. 5 refs.

Four new stocks of Lithodids were observed in the Indian Ocean between Marion and Crozet Islands: four juveniles at 220-245 m of depth and two adults at 480-525 m, which would confirm the hypothesis of a vertical migration depending on size in this species.

B-29711

Bonner, W.N., **Status of the antarctic fur seal, *Arctocephalus gazella*,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1982 Vol.4, Mammals in the seas. Vol.4. Small cetaceans, seals, sirenians and otters, p.423-430, With French and Spanish summaries. 25 refs.

DLC QL713.2.F66

The Antarctic fur seal, *Arctocephalus gazella,* is found on islands south of the Antarctic Convergence and north of about 60 S latitude: South Georgia, with a major breeding population of about 369,000, and smaller groups, whose state is not well known, at the South Shetland, South Orkney and South Sandwich Islands, Bouvet Island, the Kerguelen Islands, Heard Island and McDonald Island. The Antarctic fur seal is now recovering from earlier uncontrolled hunting and shows promise of attaining its former abundance. It is protected by law over most of its range. Krill forms the staple diet of the species at South Georgia: increased availability of this food due to large reductions of southern baleen whale stocks may be connected with the rapid increase of fur seals. Conversely, major expansion of present small-scale commercial krill fishing is a potentially serious threat to Antarctic pinnipeds and emphasizes the necessity for international control beforehand. (Auth.)

B-29712

Warneke, R.M., **Distribution and abundance of seals in the australasian region, with summaries of biology and current research,** *Food and Agriculture Organization of the United Nations. FAO fisheries series No.5,* 1982 Vol.4, Mammals in the seas. Vol.4. Small cetaceans, seals, sirenians and otters, p.431-475, With French and Spanish summaries. Refs. p.469-475.

DLC QL713.2.F66

This paper is a broad summary of pinnipeds resident in the waters of Australia and New Zealand: Australian fur seal, *Arctocephalus pusillus doriferus;* New Zealand fur seal, *A. forsteri;* Australian sea lion, *Neophoca cinerea;* New Zealand sea lion, *Phocarctos hookeri;* and southern elephant seal, *Mirounga leonina.* All 5 species were subjected to a long period of unregulated, geographically expanding exploitation, resulting in reductions of breeding stocks and extremely slow recovery. In the Australasian region, *M. leonina* is centered on Macquarie Island, where the colony is now stable at its maximum sustainable level of about 95,000 animals before whelping; a small but thriving breeding colony, including at least 300 females, is present on Campbell Island. Long-term life history studies of this species have yielded a good understanding of its biology. Of all the Australasian seals, only *M. leonina* could presently support commercial exploitation on a sustained-yield basis, offering 2 population surpluses at Macquarie Island: harvesting of weaned pups appears safe from both numerical and behavioral standpoints while the taking of surplus males at maximum weight presents difficulties, with possible disruption of reproduction activities. Data on food, feeding and effects on fisheries are presented. (Auth. mod.)

B-29715

Liebezeit, G., **Particulate carbohydrates in relation to phytoplankton in the euphotic zone of the Bransfield Strait,** *Polar biology,* 1984 2(4), p.225-228, 15 refs.

The composition and depth distribution of particulate carbohydrates for 5 stations in the Bransfield Strait is discussed in relation t
phytoplankton species composition. Glucose, the most prominen
sugar at diatom dominated stations, is reduced by 70% from the su
face to 100 m depth whereas total carbohydrates show a 40% degrada
tion. Values for a haptophyceae dominated station are 95 and 80%
respectively. (Auth.)

B-29716

Castellini, M.A., Davis, R.W., Davis, M., Horning, M., **Antarctic marine life under the McMurdo Ice Shelf at White Island: a link between nutrient influx and seal population,** *Polar biology,* 1984 2(4), p.229-231, 13 refs.

Throughout 1981, the first routine collections of a variety of fis
were made under the McMurdo Ice Shelf near White Island, Antar
tica. Estimates of their local biomass were calculated using food co
sumption patterns of resident seals. Since no significant primary pr
duction occurs at White Island, the resident fauna must be maintaine
by a large nutrient influx from the Ross Sea. (Auth.)

B-29717

Broady, P.A., Garrick, R., Anderson, G., **Culture studies on the morphology of ten strains of antarctic *Oscillatoriaceae* (Cyanobacteria),** *Polar biology,* 1984 2(4
p.233-244, 29 refs.

In this report, the morphology of ten strains of blue-green alg
is examined at equal age under identical conditions in culture. Pla
mass and microscopic morphological characteristics are recorded f
each strain. On the whole it was found to be more reliable and co
venient to distinguish strains on the bases of cell and trichome th
by their plant mass characteristics. Correlations are attempted
the basis of trichome and cell morphology between the strains
culture and previous records from Antarctica identified as classic
species. Also, the strains are correlated where possible with those d
scribed earlier from axenic cultures. Ambiguities are highlighted
classical and culture-based taxonomic systems, due to our lack
knowledge of sheath variability. It is concluded that wide-rangi
continued investigation of the *Oscillatoriaceae* from Antarctica cou
contribute to a useful and reliable taxonomic system. (Auth.)

B-29718

Marschall, H.-P., Hirche, H.-J., **Development of eggs and nauplii of *Euphausia superba*,** *Polar biology,* 1984 2(4), p.245-250, 22 refs.

The development of eggs and nauplii was studied over 19 da
At 1.5 C nauplii hatched after 5 days. Abdominal spines chang
their appearance successively during nauplius development, but
moulting was observed in the course of naupliar developme
Moulting occurred between the nauplius and the metanauplius st
13 days after spawning. Swimming activity was weak in the naupli
while it was vigorous in the metanauplius. A model is presented
the depth distribution of eggs and larval stages. It is also suggest
that present collection techniques may inadequately sample eggs a
nauplii based on experiments that show that eggs are extremely sen
tive to sieving. (Auth.)

B-29719

Duchêne, J.C., **Reproductive biology of *Boccardia polybranchia* (Carazzi),** *Polar biology,* 1984 2(4), p.251-257, 31 refs.

This work is carried out with samples taken during two south
summers in Kerguelen Archipelago. Animals were found in san

pebbles, in a tidal zone often beaten by the sea and with fresh water incomes. Densities of about 5000 individuals per square meter were found. Body growth and reproduction were observed during the summer period, between December and April. *B. polybranchia* in this area presents a lecithotrophic type development, with adelphophagy. The general body growth suggests that *B. polybranchia* has an r-strategy. This adelphophagy and its place in the reproductive strategies is discussed. Examples among polydorids show that planktotrophic and lecithotrophic types of reproduction can be found and that integration in r- and k-reproductive strategy gradients is difficult. In fact oocyte sizes and amounts of produced oocytes are quite variable for a given place in the continuum. The transition from the planktotrophic to the lecithotrophic type observed within the same family suggests an adaptation of larvae to food availability resulting from growth arrest of part of the eggs, or from a failure in fertilization of part of the oocyte stock. (Auth.)

B-29720

Ricklefs, R.E., Roby, D.D., **Development of homeothermy in the diving petrels *Pelecanoides urinatrix exsul* and *P. georgicus*, and the antarctic prion *Pachyptila desolata*,** *Comparative biochemistry and physiology,* 1983 75A(2), p.307-311, 14 refs.

Body temperatures of South Georgia diving petrel chicks increased from about 37.5 C at hatching to between 38.5 and 39 C within two weeks. Temperatures of common diving petrel chicks averaged 38.8 C after two weeks of age. Burrow temperatures varied between 5 and 10 C. Measurements of oxygen consumption and body temperature indicated petrel chicks achieve effective endothermy at 5 C after 5-9 days, and 0 days in the antarctic prion. The maximum mass-specific, cold-induced oxygen consumption of small chicks was achieved at 3-6 days in the petrels, and 0 days in the prions. Mass-specific thermal conductance decreased with age and body size in all 3 species, but was highest in *P. u. exsul* and lowest in *P. desolata.* Conductance was similar at the age of effective endothermy in all 3 species. The period required for the development of endothermy is related to age-specific changes in both conductance and capacity for heat production and it closely parallels the length of the brooding period. It is suggested that the length of the period of thermal dependence of the chick is related to the distance between feeding areas and the nesting site. (Auth.)

B-29721

Thomas, J.A., Zinnel, K.C., Ferm, L.M., **Analysis of Weddell seal *(Leptonychotes weddelli)* vocalizations using underwater playbacks,** *Canadian journal of zoology,* July 1983 61(7), p.1448-1456, 21 refs.

The Weddell seal in McMurdo Sound has a large repertoire of underwater vocalizations (12 calls with 34 types) ranging from short pulses to long frequency-modulated sweeps. Individual vocalizations were projected under water to seals at breeding colonies to investigate their functions. Responses were affected by the time of day, length of experiment, and composition of the colony. Specific vocalizations were given in response to particular playbacks. The duration of responses changed for different types of playbacks, but the number of elements per series did not. Only functions for vocalizations associated with breeding were assigned. (Auth.)

B-29723

Odening, K., ***Paramonostomum antarcticum* (Trematoda, Notocotylidae) in *Larus dominicanus* in the South Shetlands (Antarctica)** [*Paramonostomum antarcticum* (Trematoda, Notocotylidae) in *Larus dominicanus* der Südshetlands (Antarktis)], *Angewandte Parasitologie,* Aug. 1982 23(3), p.137-143, In German with English and Russian summaries. 10 refs.

Paramonostomum antarcticum from the rectum of a blackbacked gull from King George Island is described. As a result *Larus dominicanus* is presented as a new host of this trematode. The morphology is compared with the original description and with the description of *P. signiense.* The relations between the two possibly identical antarctic species are discussed. It is proposed to invalidate the subgenus *Paramonostomoides.* (Auth.)

B-29738

Lukowski, A.B., Opaliński, K.W., **DDT in the vicinity of Molodezhnaya Station** [DDT v raĭone stantsii Molodezhnoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.68-71, In Russian. 4 refs.

Chemical analyses of bottom sediments from several ponds in northwestern Antarctica showed one in particular, lake No.7, to contain 4ppb of DDT and 22.1ppb of DDE. These results are attributed to pollution by excrements of birds and seals.

B-29747

International Whaling Commission, **Thirty-first report of the International Whaling Commission,** Cambridge, England, 1981, 864p., Refs. passim. For selected papers see B-29748 through B-29773.

DLC SH381.I484

The report contains the materials from the 32nd Annual Meeting, the Workshop on Sperm Whales and the report of the Third Meeting of the Scientific Working Group on Management Procedures. In addition, eighty-five scientific papers are included, twenty-six of which are reports of studies carried out in the Southern Hemisphere.

B-29748

Grenfell, B.T., Beddington, J.R., **New population model and assessment technique based on proportional maturity and recruitment with application to the minke whales of the Southern Hemisphere,** *International Whaling Commission. Report,* 1981 No.31, p.233-239, 13 refs.

DLC SH381.I484

A new model is introduced for minke whale populations, based on proportional maturity by age as opposed to the less realistic knife-edged maturity assumption of the existing formulation. The model is used to estimate Antarctic Area IV and pooled Area III and IV stock sizes, based on catch for known effort relative abundance data under a number of least squares assumptions. An estimation technique new to minke whales studies, which uses catch at age data to fit catch for known effort by age, is introduced, and its results, applied to the Area IV and Area III and IV groupings, are presented and compared with those for undifferentiated catch/effort. The results of pooling the Area III and IV data are contrasted with relative abundance figures for the two Areas produced by the IWC Scientific Committee in 1979. (Auth.)

B-29749

Horwood, J.W., **Results from the IWC/IDCR minke marking and sightings cruise, 1979/80,** *International Whaling Commission. Report,* 1981 No.31, p.287-313, 11 refs.

DLC SH381.I484

This study presents the observations and results from the 1979/80 IWC/IDCR minke whale marking and sightings exercise in Area III. 703 minke whales were marked with 0.410 marks and 11 sperm whales with 12 bore marks. The hit rate was 50 per cent with 15 double-marked. A small number of minke whales were damaged by the marking. A tentative assessment, based on no returns from a recapture of 1,223 indicated a recruited population size of over 127,000. 4,357 minke whales were seen in 1,046 schools and the numbers of other large and small whales is reported. An estimate of minke whales is given as 96,000 with a recruited population of 63,000. A discussion of the relative densities of whales in Areas III and IV is provided. (Auth.)

B-29750
Holt, S., Carr, J., Fraser, L., **Note on the sex ratios in Southern Hemisphere catches of minke whales,** *International Whaling Commission. Report,* 1981 No.31, p.315-317.

DLC SH381.I484

Presented are tables showing: Southern Hemisphere minke whale catches by fleet (Soviet or Japanese), year (1972-80), area and sex ratios; comparison of percent females on occasions when both fleets operated in the same 10 deg square, same month, same year; and sex ratios (% females) in Japanese Southern Hemisphere catches by 5 deg latitudinal bands from mean February ice edge during (1971/72-1976/77).

B-29751
Holt, S., **History of the regulation of southern minke whaling scientific advice and a response of industry,** *International Whaling Commission. Report,* 1981 No.31, p.319-322.

DLC SH381.I484

Presented are tables showing: Southern Hemisphere minke whale quotas and catches, as set by the International Whaling Commission for 1971/72-1979/80 seasons; Scientific Committee advice and notes on regulatory decisions; ratios of catches to maximum permitted catches, taking account of land station/pelagic agreements; and sex ratios in pelagic catches, 1972/73-1979/80.

B-29752
Ohsumi, S., **Estimation of the population size of the minke whale in Antarctic Area 6 by means of whale sightings,** *International Whaling Commission. Report,* 1981 No.31, p.323-326, 5 refs.

DLC SH381.I484

Data on minke whale sightings by scouting boats in Antarctic Area 6 in the 1978/79 and 1979/80 seasons are presented, from which an attempt is made to estimate the abundance of the minke whale in that area. It is concluded that, by extrapolation, the population size would be 159,000 to 185,000 individuals.

B-29753
Yamamura, K., Ohsumi, S., **Comparison of the yearly changes in CPUE for minke whales in the Antarctic based on Japanese and Soviet effort data,** *International Whaling Commission. Report,* 1981 No.31, p.327-332, 6 refs.

DLC SH381.I484

Catch, effort and catch per unit effort of minke whales caught in the waters south of 60 S by Japanese and Soviet fleets are compared by calculations from four types of fishing effort. The study revealed no evidence of a decrease in the population of minke whales in any Area of the Antarctic despite fishing differences observed.

B-29754
Lockyer, C., **Estimation of the energy costs of growth, maintenance and reproduction of the female minke whale, *(Balaenoptera acutorostrata),* from the Southern Hemisphere,** *International Whaling Commission. Report,* 1981 No.31, p.337-343, 17 refs.

DLC SH381.I484

Growth curves and energy budgets have been calculated for female minke whales having different growth rates and ages at sexual maturity of 6 years and 14 years. Results indicate that the currently observed decline in age at sexual maturity and changes in growth rates are energetically feasible. The proportion of food actually requi
for growth relative to maintenance after the first year of life is v
small, <6%, regardless of growth rate. The proportional extra f
energy required to effect faster growth and earlier maturation
minke whales is similar to that required to produce the obser
changes in these parameters in fin whales. The relative total cost
pregnancy and lactation in minke whales are also similar to thos
fin whales, implying that the currently proposed annual calvin
energetically possible for the minke whale. (Auth.)

B-29755
Kasamatsu, F., Ohsumi, S., **Distribution pattern of mink
whales in the Antarctic with special reference to the se
ratio in the catch,** *International Whaling Commission.
Report,* 1981 No.31, p.345-348, 2 refs.

DLC SH381.I

This paper examines some of the distribution characteristic
the minke whales in the antarctic whaling grounds, especially in A
4, using Japanese whaling data for 1971/72-1979/80. Geograph
differences and monthly changes in sex ratio, and latitudinal
seasonal distribution of catch per unit effort, are discussed. W
females outnumbering males, minke whales are found to be m
abundant in the higher latitudinal waters near to the pack ice e

B-29756
Shimadzu, Y., Kasamatsu, F., **Operating pattern of
Japanese whaling expeditions engaged in minke whaling
the Antarctic,** *International Whaling Commission. Rep*
1981 No.31, p.349-355, 2 refs.

DLC SH381.I

The operating patterns of the Japanese whaling expeditions
gaged in minke whaling in the Antarctic from 1971/72 to 1979/80
explained. The discontinuities in the catch by geographical area
time are shown to be caused by the convenience and efficienc
operations for multi-species exploitation under the Areal quota
tem. (Auth.)

B-29757
Brown, S.G., Best, P.B., **Recoveries of whale marks fro
minke whales in the Southern Hemisphere,** *Internationa
Whaling Commission. Report,* 1981 No.31, p.357-358,
refs.

DLC SH381.I

The distribution of minke whales marked in the Internati
Marking Scheme up to and including the 1979/80 antarctic seas
outlined and all whale marks returned to date are listed. New p
lation estimates for minke whales in Area IV are made using
additional marks returned from whales killed in the 1979/80 sea
(Auth.)

B-29758
Furukawa, F., **Minke whaling in the 34th antarctic
whaling season, 1979/80,** *International Whaling
Commission. Report,* 1981 No.31, p.359-361.

DLC SH381.I

Characteristics of minke whaling operations are described
special attention to the pack-ice condition as, at the peak of
whaling season, the closer the pack ice the higher the density of m
whales. The pack-ice conditions are classified into seven categ
according to the hardness and the density of the ice. An outlin
minke whaling in the 1979/80 season is given, with catch details f
areas 3, 4 and 5.

B-29759

Ohsumi, S., Shimadzu, Y., **Catch and effort statistics for minke whaling: Japanese expeditions in the Antarctic, 1971/72-1979/80,** *International Whaling Commission. Report,* 1981 No.31, p.363-366, 5 refs.

DLC SH381.I484

Catch and effort statistics for minke whaling by the Japanese expeditions in the Antarctic for 1971/72 to 1979/80 seasons are compiled and listed on a daily basis together with measurements of weather conditions. An example of record format is given and explained. (Auth.)

B-29760

Kato, H., **Trial-firing of .410 marks at a minke whale carcase on the factory ship, 1979/80 antarctic season,** *International Whaling Commission. Report,* 1981 No.31, p.367-370, 5 refs.

DLC SH381.I484

Trial-firing of .410 marks at minke whale carcases was carried out on the factory ship on 19 January 1980 in order to determine the most effective marking distance and part of the body for marking without damaging any internal organs. 30 marks were fired at one angle of aspect (30 deg) and two angles of incidence (20 deg and 45 deg). As a result the most effective distances were estimated to be from 10 m to 35 m with normal firing angles (30 deg aspect, 45 deg incidence). Firing at an angle less than 10 deg should be avoided. The most suitable parts of the body for marking were in the dorsal region of the anterior and near the dorsal fin. (Auth.)

B-29761

Ohsumi, S., **Estimation of the population size of the fin whale in Antarctic Area 6 using sightings data,** *International Whaling Commission. Report,* 1981 No.31, p.403-406, 4 refs.

DLC SH381.I484

Results of the present study are in agreement with previous estimates of the exploitable population size of fin whales in Area 6. The estimate of population size from sightings data reported in this paper is based on Doi's whale sighting theory.

B-29762

Mizroch, S.A., **Analyses of some biological parameters of the antarctic fin whale *(Balaenoptera physalus)*,** *International Whaling Commission. Report,* 1981 No.31, p.425-434, 8 refs.

DLC SH381.I484

Antarctic fin whale ovulation rates, female ages at maturity, and pregnancy rates by age were studied using data collected by the Japanese Far Seas Fisheries Research Laboratory from 1965/66-1977/78. Ovulation rates appear to be curvilinear rather than linear functions, and analyses assuming linearity are likely to give misleading results. Most female fin whales caught during the period of collection mature between ages six and seven, and the increase in proportion mature over the age range 1-15 appears to conform to a logistic curve. There was no evidence of senescence as represented by a decline in pregnancy rate with age, which corroborates findings of Wheeler (1930), Laurie (1937), and Laws (1961). (Auth.)

B-29763

Berzin, A.A., Vladimirov, V.L., **Changes in the abundance of whalebone whales in the Pacific and the Antarctic since the cessation of their exploitation,** *International Whaling Commission. Report,* 1981 No.31, p.495-499, 25 refs.

DLC SH381.I484

Sightings data for protected species in the Pacific and Antarctic from 1976-79 are presented. Although the state of the baleen whale populations remains serious, there are indications that some populations are now increasing e.g. the Okhotsk Sea population of bowhead whales, blue and fin whales in the North and South Pacific and humpback whales around New Zealand. (Auth.)

B-29764

Budylenko, G.A., **Distribution and some aspects of the biology of killer whales in the South Atlantic,** *International Whaling Commission. Report,* 1981 No.31, p.523-525, 11 refs.

DLC SH381.I484

Killer whales *(Orcinus orca)* are widely distributed in the South Atlantic. Data are presented which were obtained from the whaling vessel *Yuri Dolgorukiy* in the months November-May, 1960-75. During this period killer whales were observed in warm, temperate and cold waters. In temperate waters, the bulk of the diet consists of dolphins and fish, while in the colder waters, minke whales are the dominant food species. Killer whales are most commonly seen in groups of about 10 animals. Groups of 10-20 animals are less common and groups of over 100 are occasionally seen. The size of the killer whale groups is determined by the hunting strategy. (Auth.)

B-29765

Dahlheim, M.E., **Review of the biology and exploitation of the killer whale, *Orcinus orca,* with comments on recent sightings from Antarctica,** *International Whaling Commission. Report,* 1981 No.31, p.541-546, 26 refs.

DLC SH381.I484

Killer whales, *Orcinus orca,* are cosmopolitan in distribution. At present, a single species is recognized; however, various geographical races may exist. Population estimates are not available on a worldwide basis. Killer whales are usually found in pods and most activities appear to be group oriented. A population birth rate of 4-5% is suggested. Various other life history parameters on *O. orca* are discussed. Killer whales appear to be opportunistic feeders. Distribution of this species seems to be dependent upon the distribution and migration of prey items. A worldwide summary of the exploitation and utilization of this species is given for the years 1948-80. (Auth.)

B-29766

Mikhalev, IU.A., Ivashin, M.V., Savusin, V.P., Zelenaia, F.E., **Distribution and biology of killer whales in the Southern Hemisphere,** *International Whaling Commission. Report,* 1981 No.31, p.551-565, 27 refs.

DLC SH381.I484

Biological and distributional data for southern Hemisphere killer whales, collected between 1961/62 and 1978/79 are analyzed. It appears that killer whales are found in warm waters in winter and migrate into high latitudes in the summer. From the available data six populations of killer whales are proposed (classified by their winter distribution): Western American; Eastern American; Western African; Eastern African; Western Australian; Eastern Australian; although it is believed further populations will be determined in the future for the open waters of the Atlantic, Indian and Pacific Oceans. The migration appears to be linked with that of its prey species, in particular the minke whale. Morphological and reproductive data are presented and discussed. A new species of killer whale, the dwarf killer whale *Orcinus nanus* is proposed. (Auth.)

B-29767

Tillman, M.F., Ohsumi, S., **Japanese antarctic pelagic whaling prior to World War 2: review of catch data,** *International Whaling Commission. Report,* 1981 No.31, p.625-627, 5 refs.

DLC SH381.I484

Comparison of data sources indicate that the statistical system of the Bureau of International Whaling Statistics (BIWS) did account for

Japanese whaling in the Antarctic prior to World War II. Computer tapes from the BIWS were found not to contain catches for 1939-40 and 1940-41 seasons, although these data were available in the published reports. Japanese whaling occurred in Area VI only during the 1940-41 season when seven fin whales were taken. (Auth.)

B-29768

Mizroch, S.A., **Further notes on Southern Hemisphere baleen whale pregnancy rate,** *International Whaling Commission. Report,* 1981 No.31, p.629-633, 11 refs.

DLC SH381.I484

Some recruitment models (Allen, 1976; Tillman, 1978) are based on the assumption that reproductive rates and mortality rates vary in a density dependent manner with reproductive rates increasing as a population declines. It was reported by Mackintosh (1942), Laws (1961), and Gambell (1968, 1973, 1976) that baleen whale pregnancy rates showed some evidence of density dependent increases, but analyses presented in this paper show that upon careful examination of the data, there appears to have been no such increase in blue or fin whale pregnancy rates. It is apparent that baleen whale pregnancy rates have not shown the density dependent changes expected as the baleen whale biomass declined due to exploitation. (Auth.)

B-29769

Ivashin, M.V., **Some results of the marking of sperm whales *(Physeter macrocephalus)* in the Southern Hemisphere under the Soviet marking programme,** *International Whaling Commission. Report,* 1981 No.31, p.707-718, 26 refs.

DLC SH381.I484

Between 1952/53 and 1978/79, 1,422 sperm whales were marked in the nine Divisions of the Southern Hemisphere under the Soviet Marking Programme. Of these 402 were marked south of 40 S. Forty-five marks have been returned so far. Recovery time has ranged from the year of marking to 15 years after marking. One-third of the returns were from Division 3 (20 E-60 E). In some cases the whales had traveled considerable distances within the warm and temperate waters of the Atlantic Ocean. Males and females tended to keep to the same feeding (wintering) grounds although cases of whales moving between adjacent Divisions occurred. Returns from whales marked in the warm zone of the Northern Hemisphere showed that breeding may occur between whales of both hemispheres. (Auth.)

B-29770

Mikhalev, IU.A., Savusin, V.P., Ivashin, M.V., Kishiian, N.A., **Problem of the feeding of sperm whales from the Southern Hemisphere,** *International Whaling Commission. Report,* 1981 No.31, p.737-745, 44 refs.

DLC SH381.I484

Quantitative and qualitative data on the stomach contents of over 15,000 sperm whales taken in the Southern Hemisphere by Soviet whalers from 1970-79 are discussed. It is shown that the degree of 'fullness' varies with latitude of operations. In tropical and sub-tropical zones the 'fullness' was low, in temperate waters the 'fullness' level rose while in high latitudes it increased still further such that only 10% of the stomachs were empty. It is likely that this is the result of the greater productivity of the high latitudes. The species composition of the food is also found to vary with latitude with a greater number of species in the lower latitudes. In all areas squid were the most common (up to 95%) group. Sperm whales feed at various depths: 230 m (females) and 450 m (males) in the warm zone increasing to 500 m and more in the high latitudes. The dominant food species are presented for several geographical regions. (Auth.)

B-29771

Miyashita, T., Ohsumi, S., **Estimation of the population size of the sperm whale in the Southern Hemisphere usin sightings data,** *International Whaling Commission. Report,* 1981 No.31, p.805-812, 4 refs.

DLC SH381.I48

By the estimated lengths of the sperm whales sighted by scoutin boats in the Southern Hemisphere from 1977/78 to 1979/80, the tota and exploitable population size for each Division of the Souther Hemisphere is calculated. The total estimated population size in th Southern Hemisphere is more than 738,500 of which at least 644,30 are over the minimum size limit.

B-29772

Brown, S.G., **Movements of marked sperm whales in the Southern Hemisphere,** *International Whaling Commission. Report,* 1981 No.31, p.835-837, 1 refs.

DLC SH381.I48

A total of 3,558 sperm whales have been marked in the Souther Hemisphere during whale marking carried out in the international an USSR marking schemes in the period 1945/46 to 1979. Marks hav been returned from 93 of these whales. The numbers of whale marked and of whales from which marks have been returned ar tabulated for each of the nine sperm whale Divisions. All return showing substantial movements have been plotted and details ar given of 12 whales showing movements across the boundaries of Divisions. (Auth.)

B-29773

Allen, K.R., **Estimation of RII recruitment rate and age a recruitment from Southern Hemisphere Division 5 catch data,** *International Whaling Commission. Report,* 1981 No.31, p.839-842, 4 refs.

DLC SH381.I48

Recruitment rate and mean age at recruitment were calculated b the CPOP program for age distributions obtained by applying two age length keys for Albany coastal catches in 1964-65 and 1973-74 t length distributions for Albany catches in 1957-75 and Division pelagic catches in 1951-70. The results are tabulated. No significant trends over time were shown in either recruitment rate or mea age at recruitment. The year-to-year variability of the estimates wa compared with that obtained with a simulation procedure using model population with an age distribution similar to that of the Alban catches and with a catch size of 500, similar to the mean catches o the series. The variability of the Albany results is similar to that o the simulations, suggesting that the annual fluctuations are due t sampling effects about a constant true value. The same applies to th pelagic data up to 1961. After this time the variability is greater. I this later period catching was extended from the waters south of 4 S into warmer waters. The increased variability may therefore b related to the variable proportions of the catches taken in norther and southern waters in the later years. No correlation could, howev er, be found between the annual values of of the recruitment rate an mean age at recruitment and the distribution of the catch. (Auth.

B-29774

International Whaling Commission, **Thirty-second report o the International Whaling Commission,** Cambridge, England, 1982, 950p., Refs. passim. For selected papers see B-29775 through B-29788.

DLC SH381.I48

The report covers the activities of the Commission in both Hem spheres during 1980 and 1981. It also contains materials from th following meetings: the 33rd Annual Commission and Scientific Committee Meetings; the Workshop on the Design of Sightings Survey the Workshop on the Identity, Structure and Vital Rates of Kill Whale Populations; and the Special Meeting on Southern Hemispher

Minke Whales. In addition to the reports of these meetings, eighty-seven scientific papers are included, fourteen of which are reports of studies carried out in the Southern Hemisphere.

B-29775

Clark, W.G., **Historical rates of recruitment to Southern Hemisphere fin whale stocks,** *International Whaling Commission. Report,* 1982 No.32, p.305-324, 19 refs.

DLC SH381.I484

In most long-term assessments of whale stocks, net recruitment rates have been either assumed, or calculated from observed changes in female reproductive parameters. Except for Allen's work on fin whales, there have been no direct estimates of long-term changes in recruitment to an exploited stock, so while the population models used by the Scientific Committee are entirely reasonable, there has not yet been any empirical justification of their application to whales. Since Allen's estimates of early age compositions may well have been biased by the use of recent age-length keys, this paper attempts to obtain unbiased estimates by decomposing the length distributions in a different way, and then back-calculates year-class and parent stock sizes much as Allen did but with a more detailed age structure. Where Allen found no increase in recruitment rates and perhaps even a decline during the period of exploitation, the results obtained here are unequivocal in showing a decline in almost every stock. While this conclusion is firmly supported, even required, by the age-length data on which the estimates were based, there are some inexplicable differences between these data and other work on the growth of fin whales that directly challenge the fundamental assumption of the estimation procedure and therefore the validity of the results. (Auth.)

B-29776

Leatherwood, S., Todd, F.S., Thomas, J.A., Awbrey, F.T., **Incidental records of cetaceans in southern seas January and February 1981,** *International Whaling Commission. Report,* 1982 No.32, p.515-520, 8 refs.

DLC SH381.I484

Number of observations, group size, indices of abundance, species and distribution of cetaceans incidentally observed in the Pacific section of the antarctic ocean in January and February 1981 are tabulated and discussed.

B-29777

Awbrey, F.T., Thomas, J.A., Evans, W.E., Leatherwood, S., **Ross Sea killer whale vocalizations: preliminary description and comparison with those of some Northern Hemisphere killer whales,** *International Whaling Commission. Report,* 1982 No.32, p.667-670, 13 refs.

DLC SH381.I484

Vocalizations of free-ranging killer whales *(Orcinus orca)* were recorded in antarctic waters in 1979-81. Peak energies in a wide variety of clicks, click trains, pulsed vocalizations, screams, cries and tonal sounds ranged from below 1 kHz to over 30 kHz. To the human ear, antarctic killer whale cries sound higher pitched than those of northern populations. Broadband clicks emphasized a wide range of frequencies and often were very similar to the clicks recorded from British Columbian whales. Antarctic killer whale sounds generally tended to resemble those of other regions in timing characteristics but to emphasize somewhat higher frequencies. (Auth.)

B-29778

Best, P.B., **Seasonal abundance, feeding, reproduction, age and growth in minke whales off Durban (with incidental observations from the Antarctic),** *International Whaling Commission. Report,* 1982 No.32, p.759-786, Refs. p.785-786.

DLC SH381.I484

Although minke whales were present in temperate waters of the southwestern Indian Ocean throughout the year, their abundance off Durban rose to a peak from June to September, when the catch was predominantly of sexually mature animals in which males outnumbered females 2:1. The composition of schools in August and September suggested that pairing took place at this time. Feeding off Durban was at a very low level, and consisted almost entirely of euphausiids. Scarring on the bodies (especially flippers) of some minke whales in the Antarctic suggested unsuccessful killer whale attacks. Males examined at Durban reached sexual maturity at 24.9 feet and females at 26.6 feet. Mature males at Durban had heavier testes than those from the Antarctic. Most (63.3%) of the mature females examined had recently ovulated, but very few (0.9%) were obviously pregnant. The majority (77.1%) of animals were still lactating when ovulation occurred, and from the size of three accompanying calves it is estimated that ovulation occurred about 4 months after parturition. Lactation is estimated to last 6 months, and the minimum calving interval to be about 14 months. From the proportion of resting females in the catch the "true" pregnancy rate is calculated to be 78.4% (or an average calving interval of 15.3 months). (Auth.)

B-29779

Joyce, G.G., **Blow patterns as sighting cues for censusing minke whales in antarctic waters,** *International Whaling Commission. Report,* 1982 No.32, p.787-790, 4 refs.

DLC SH381.I484

Minke whales *(Balaenoptera acutorostrata)* in antarctic waters have been censused each year since 1978 under the International Whaling Commission's International Decade for Cetacean Research (IWC/IDCR). The major sighting cue for spotting minke whales is their blow. The dynamics of this cue were studied during the 1980-81 IWC/IDCR Minke Whale Assessment Cruise to determine how blow patterns influence sighting reliability. The distribution of blows was observed for 15 groups of minke whales; the group size varied from 1 to 50 individuals. The duration individual blows were visible was timed for three groups. Results indicate that the distribution of blows was irregular. The time of day did not appear to affect the frequency of blows. The maximum duration between blows was 7.73 minutes. The duration individual blows were visible ranged from 1.4-16.1 seconds (mean: 6.2 seconds; standard deviation: 4.4 seconds). (Auth.)

B-29780

Brown, S.G., Wada, S., **Southern Hemisphere marking of minke whales,** *International Whaling Commission. Report,* 1982 No.32, p.803-808, 10 refs.

DLC SH381.I484

A total of 1,773 minke whales are estimated to have been effectively marked with .410 calibre whale marks in the Southern Hemisphere up to the close of the 1979/80 whaling season as part of the International Whale Marking Scheme. 253 additional whales have been marked with 12-bore marks in the USSR scheme. The distribution of these marked whales is plotted. Details of the 29 marks recovered are given and the movements illustrated by them are discussed. Problems of estimating the numbers of effectively marked whales when using the .410 mark are noted. (Auth.)

B-29781

Clark, W.G., **Early changes in the recruitment rates of antarctic minke whales inferred from recent age distributions,** *International Whaling Commission. Report,* 1982 No.32, p.889-895, 9 refs.

DLC SH381.I484

The steep slopes of the age compositions of antarctic minke whale catches are regarded as indicating a gross recruitment rate in excess of natural mortality. This paper reports an effort to discover by simulation what rate of natural mortality and what early changes in recruitment rates would be necessary to account for the shape of recent age distributions. The exercise strongly indicates a value of M in the range of 0.04-0.06 and a severalfold increase in recruitment rates between 1930 and 1950, when blue whales were being depleted. Alternatively, the steep slopes of recent age distributions could just as well be explained by declining catchability with age or increasing natural mortality with age, of which there is some evidence in the data. (Auth.)

B-29782

Miyashita, T., **Estimation of the population size of minke whales in Areas 3 and 4 in 1980/81 using a mark recapture method,** *International Whaling Commission. Report,* 1982 No.32, p.897-898, 4 refs.

DLC SH381.I484

Although no marking was carried out in Areas III and IV in the 1980/81 season, the calculaltion of the survivors of whales marked in earlier seasons enables us to estimate the population size using a mark recapture method. The resultant population estimates in Areas III and IV are as follows: Area III: 200,555; Area IV: 126,945; Area (III + IV): 318,911. (Auth.)

B-29783

Shimadzu, Y., Kasamatsu, F., **Operating pattern and time budget data for antarctic minke whaling by the Japanese Expedition in 1980/81,** *International Whaling Commission. Report,* 1982 No.32, p.899-900, 4 refs.

DLC SH381.I484

Catch and effort data for the antarctic minke whaling by the Japanese expeditions in 1978/79-1980/81 are discussed, and tabulated summaries presented. The cruise track of *Nissin Maru* No.3 research ship is shown.

B-29784

Shimadzu, Y., **Unbalanced sex ratio in the minke whale catch and its effect on management,** *International Whaling Commission. Report,* 1982 No.32, p.905-909, 8 refs.

DLC SH381.I484

The catches and sex ratio in the catch of the antarctic minke whale are given by Area and by year. The present total quota system based on the female RY is shown to have an ambivalent effect. A block quota system is proposed. (Auth.)

B-29785

Miyashita, T., **Estimation of the population size of minke whales in Area 1 using sightings and marking data,** *International Whaling Commission. Report,* 1982 No.32, p.911-917, 15 refs.

DLC SH381.I484

The Japanese scouting boat *Shonanmaru* No.2 engaged in whale sightings and marking in Area I in the 1980/81 season. From these data the population size of minke whales is estimated using various sightings and mark recapture methods. (Auth.)

B-29786

Doi, T., Kasamatsu, F., Nakano, T., **Simulation study on sighting survey of minke whales in the Antarctic,** *International Whaling Commission. Report,* 1982 No.32, p.919-928, 9 refs.

DLC SH381.I484

Diving (T) and blowing (tau) times for minke whales are estimated from observations carried out by *Kyo-Maru* No.27 and *Toshi-Maru* No.11 in 1980/81 to be: T=2 min, tau=2.3 sec. Analysis of videotapes of topmen behavior on the *Kyo-Maru* No.27 reveals the angular scanning velocity, w, to be 2.7 deg/sec. The human physiological discrimination function is calculated. A computer simulation diagram of the sighting process under various conditions is presented. (Auth. mod.)

B-29787

Naito, Y., **Sightings records of minke whales in the pack ice and adjacent waters off the coast of Enderby Land,** *International Whaling Commission. Report,* 1982 No.32, p.929-933, 5 refs.

DLC SH381.I484

Cruise tracks for two sightings periods are shown, and the sightings records tabulated, as is density, represented by the number of whales sighted per n. mile and density differences between open water areas and pack ice areas. School size of minke whales sighted in pelagic water and pack ice areas is also recorded.

B-29788

Kato, H., **Some biological parameters for the antarctic minke whale,** *International Whaling Commission. Report,* 1982 No.32, p.935-945, 21 refs.

DLC SH381.I484

Biological material and data collected by Japanese operations in the Antarctic between 1971/72 and 1979/80 are examined. Body length, age at 50% sexual maturity, pregnancy rate, ovulation rate, total mortality coefficient, foetal sex ratio and litter size are estimated by year and Area. The average body length for the whole period is 27.06 ft for males and 28.10 ft for females. In most Areas a slight increase in average body length over the period is observed, but there is no trend in the average body length of mature whales. Animals were aged by examination of ear plugs. The sexual maturity of females is estimated at 6.5 for the whole Antarctic for the whole period. The apparent pregnancy rate is estimated at 88.8% of mature females for the whole Antarctic for the whole period. No yearly trends are observed. The ovulation is estimated to be almost the same (0.883 per year) for the same area and period. The total mortality coefficient (Z) is examined using two methods, (1) involving regression analysis and (2) involving an assumption of an exponential age distribution. The Z values from both approaches are similar, 0.139-0.148 for males and 0.149-0.153 for females (whole Antarctic, full time series). The percentage of male foetuses is estimated to be 47% and the average litter size 1.006 with no trend by year or Area. (Auth.)

B-29795

Hayward, B.W., **Planktonic foraminifera (Protozoa) in New Zealand waters: a taxonomic review,** *New Zealand journal of zoology,* 1983 10(1), p.63-74, 28 refs.

Seventy percent (26 species) of the world's planktic foraminiferal taxa live in the waters around New Zealand between latitudes 28 S and 52 S. Their taxonomy—based on characters of their small, chambered, calcite tests—is reviewed, and each species is illustrated with scanning electron micrographs. The subregion straddles 3 of the world's 5 recognised foraminiferal faunal provinces. The Transitional Province passes around both main islands of New Zealand. The Subtropical Province extends from Northland to the Kermadec Islands. The Subantarctic Province extends southward from Stewart Island to beyond Campbell Island (45-55 S), and is characterised by abundant *Globigerina bulloides, Neogloboquadrina pachyderma,* and *Globigerina quinqueloba* and the presence of *Globigerinita bradyi* and *Globorotalia cavernula.* (Auth. Mod.)

B-29796

Murrish, D.E., **Acid-base balance in penguin chicks exposed to thermal stress,** *Physiological zoology,* July 1983 56(3), p.335-339, 24 refs.

The intense solar radiation on sunny, austral summer days often imposes a heat load on antarctic penguin chicks. Young penguins frequently are observed to pant for prolonged periods as a result of these thermal loads. This study is a quantitative examination of the blood gases and acid-base balance of Adélie penguin chicks at rest and during heat stress. The *in vitro* buffering capacity of two other penguin chicks, chinstrap and gentoo were also determined. During heat stress, body temperature increased from 38.7 C to 40.4 C and respiratory rate increased three to four times. This panting resulted in a decrease in PaO2 from 33.0 torr to 21.5 torr and PvO2 declined from 41.1 torr to 30.4 torr. The blood pH of panting Adélie chicks was the same as nonpanting chicks. The potential alkalosis was almost completely compensated for by a 27-fold increase in blood lactic acid. (Auth.)

B-29797

Brown, W.Y., **Conservation of antarctic marine living resources,** *Environnmental conservation,* Autumn 1983 10(3), p.187-196, 29 refs.

Areas of discussions are laid out in remarks about the May 1980 conference in Canberra which led to the promulgation of the Convention on Conservation of Antarctic Marine Living Resources. They deal particularly with those parts of the Convention which set forth the principles under which those resources could be harvested. The principles are stated in Article II: prevention of decrease in size of any harvested population to levels below those which ensure its stable recruitment; maintenance of ecological relationships among the various populations; prevention of changes or risks of changes that are not reversible in two or three decades. Interpretations are given of these specific requirements.

B-29807

Oliver, J.S., **Processes affecting the organization of marine soft-bottom communities in Monterey Bay, California and McMurdo Sound, Antarctica,** San Diego, University of California, 1980, 326p., University Microfilms order No.80-23111, Ph.D. thesis. 13 refs.

The population and community consequences of several regulatory processes are explored in soft-bottom habitats of Monterey Bay, California and McMurdo Sound, Antarctica. The dense infaunal community in the McMurdo Sound is unaffected by disruptive physical processes. The persistence of the thick tube mat apparently is related to the absence of disruptive bottom feeding fish in the Antarctic. These groveling predators are common along most tropical, temperate, and arctic shores. Field and laboratory experiments show that the crustaceans living near the sediment surface have a dramatic effect on the survival of settling larvae and small polychaetes. The phoxocephalid amphipod, *Heterophoxus videns,* is the most voracious predator among these understory crustaceans. The crustaceans probably control species composition, abundance, and especially size or age structure of the polychaete populations. Large polychaete species eventually reach a size refuge from the crustacean filter. The only abundant small polychaete species, *Tharyx* sp. (a cirratulid), has a depth refuge from the crustaceans. Similar crustaceans are present in Monterey Bay, but they are neither as large nor as abundant as the Antarctic species. As in Monterey Bay, adult polychaetes have little effect on larval recruitment into the dense assemblage. (Auth.)

B-29811

Hunter, S., **Moult of the giant petrels *Macronectes halli* and *M. giganteus* at South Georgia,** *Ibis,* Apr. 1984 126(2), p.119-132, 29 refs.

Moult scores were collected from color-ringed individuals of known reproductive status of the two species of giant petrel, *Macronectes halli* and *M. giganteus,* at Bird Island, South Georgia between 1978-81. Both species showed a substantial overlap between breeding and wing-moult, unlike most other southern ocean seabirds. Males started moult before females and both sexes of *M. giganteus* moulted at an earlier stage of the breeding cycle than *M. halli,* which breeds six weeks earlier than its congener. Changes in moult rate during the breeding season are documented for both species, with *M. halli* showing a rapid increase as the chick nears fledging. Male *M. giganteus* show a notably different pattern to the other three species-sex groups, starting moult much earlier (at egg-laying), with greater individual synchrony and usually suspending primary moult throughout the main chick growth period, whereas only two male *M. halli* and no females of either species suspended moult. Differences in pattern, timing and rate of moult are interpreted in terms of availability of food resources and the competing energy demands of other activities, especially chick-rearing. (Auth.)

B-29812

Ooizumi, T., Usuki, E., Yabe, K., Arai, K., **Digestibility of actomyosin of antarctic krill *Euphausia superba*,** *Japanese Society of Scientific Fisheries. Bulletin,* Jan. 1983 49(1), p.113-121, In Japanese with English summary. 22 refs.

A change in the muscular protein of antarctic krill with its digestive protease of hepatopancreas was studied by measuring the viscosity of actomyosin. In the presence of 1.5 M sorbitol, actomyosin was digested with various concentrations of crude protease and at various temperatures. Actomyosin of krill was several times more rapidly digestible than that of carp. When the digestion was performed in the presence of various concentrations of sorbitol (0-2.5 M), the rate constant (K') decreased with increasing molarity of sorbitol. From the linear relation between log K' and sorbitol, the K' value for actomyosin of krill without sorbitol was theoretically obtained. Sodium dodecyl sulfate-gel electrophoretic patterns of these digests showed that myosin H chain of krill was rapidly decomposed by its digestive protease, but this decomposition was effectively prevented by sorbitol. (Auth.)

B-29814

O'Sullivan, D., **Guide to the pelagic tunicates of the southern ocean and adjacent waters,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1983 No.8, 98p., Refs. p.90-95.

The characteristics of the classes, orders, families and genera of the pelagic tunicates found in the southern ocean and adjacent waters are given together with keys for their identification. 5 species of salps (order Desmomyaria), 1 species of doliolid (order Cyclomyaria) and 27 species, forms and types of larvaceans (order Appendicularia) have been found. The synonymy, diagnostic characters, geographical and bathymetric distribution of each of these is given together with an illustration and a distribution map. (Auth.)

B-29815

Kirkwood, J.M., **Guide to the Decapoda of the southern ocean,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Feb. 1984 No.11, 47p., Refs. p.39-41.

A guide to the Decapoda of the southern ocean is presented, with emphasis on those species which have been recorded south of the Antarctic Convergence. Despite being well represented in all other oceans the decapod fauna of antarctic waters is depauperate, with only eleven species having been reported from south of the Antarctic Convergence. Species found in the subantarctic waters north of the Convergence are also included in the key as their ranges may overlap with those of the Antarctic species. A key is also provided to the larvae of decapod families which are known to have Antarctic representatives. Short descriptions, with figures and records of occurrence, are presented for each of the eleven Antarctic species to enable the reader to confirm identifications from the keys. A glossary of technical terms is added. (Auth.)

B-29822

Petrov, IU.E., **Some methods of studying the vertical distribution of benthic organisms in the littoral and the upper sublittoral** [Nekotorye metody izucheniia vertikal'nogo raspredeleniia bentosnykh organizmov na litorali i v verkhneĭ sublitorali], *Akademiia nauk SSSR. Dal'nevostochnyĭ nauchnyĭ tsentr. Institut biologii moria. Sbornik rabot,* 1982 No.25, p.74-76, In Russian. 7 refs.

The relationship of the position of the maximum level of the syzygial low tide and the upper border of cortical algae growing in quiet waters was studied in the Bellingshausen Station area. Algal vertical distribution along the coast during low tide was determined using geodesic instruments. The gradual deepening of algal growth from the shallow, upper sublittoral waters into the littoral depths was measured by rulers on which the level and name of the species were recorded. This paper is a description of the measurement procedure.

B-29823

Hamoir, G., Gerardin-Otthiers, N., **Differentiation of the sarcoplasmic proteins of white, yellowish and cardiac muscles of an antarctic hemoglobin-free fish, *Champsocephalus gunnari*,** *Comparative biochemistry and physiology,* 1980 65B(2), p.199-206, 20 refs.

DLC QP1.C68

Comparisons were made by ultracentrifugation and by starch- and polyacrylamide-gel electrophoresis. Staining of the gels reveals that each type of muscle differs in parvalbumin content and distribution and shows typical isozymic patterns of lactate dehydrogenase and creatine kinase. These discrepancies are still more obvious after fractionation of the extracts with ammonium sulphate, gel filtration and DEAE-chromatography. The lack in this species of hemoglobin and myoglobin does not prevent a normal differentiation of the cardiac and of the two skeletal muscles, the yellowish muscle substituting apparently to the usual red one. (Auth.)

B-29824

Dounsevell, D., Eberhard, I., **Leopard seals *Hydrurga leptonyx* (Pinnipedia) at Macquarie Island from 1949 to 1979,** *Australian wildlife research,* Nov. 1980 7(3), p.403-415, 30 refs.

DLC QL338.A83

The annual abundance of leopard seals recorded at Macquarie I. since 1949 has regularly oscillated between a few and 100-200 individuals every 4 or 5 years. Only non-breeding individuals occur, mainly 1-, 2- and 3-year-old seals that are sexually immature, with both sexes in approximately equal numbers. The seals are present between late June and early December with greatest numbers in early August. The results of the tagging of 278 leopard seals in 1976-78 show that most of the seals are highly mobile and leave the island 1 or 2 days after they first arrive, but some may remain for up to 104 days. Each year a few of the seals tagged in the preceding year have returned to the island. In 1977 tagged seals were resighted at Campbell I. and Bicheno, Tas., providing the first detailed information on the movements of individual leopard seals over long distances. Periodic dispersal of large numbers of non-breeding leopard seals into subantarctic and temperate seas has produced the observed regular peaks in relative abundance. Possible causes of this dispersal are discussed. (Auth.)

B-29832

Platt, H.M., Mackie, P.R., **Distribution and fate of aliphatic and aromatic hydrocarbons in antarctic fauna and environment,** *Helgoländer Meeresuntersuchungen,* 1980 33(1-4), European Marine Biology Symposium, 14th, September 1979, Helgoland, edited by O. Kinne and H.-P. Bulnheim, p.236-245, 24 refs.

DLC QH301.H4

South Georgia has a history of industrial activity mainly concerned with whaling operations that peaked around 1925-1935 but has since declined to virtually nothing. Studies of the ecology of the area provided a unique opportunity to assess the long-term effects that such activities had on the ecosystem. Off the whaling stations a considerable amount of waste material, including fuel oil, was released into the bays and inevitably some of this material was deposited in the sediments. Chemical evidence in the form of both paraffinic and aromatic hydrocarbons still persists in the sediments. The implications of this persistence in relation to the possible influence of the low temperature conditions are discussed. Relatively high levels of carcinogenic/mutagenic polynuclear aromatic hydrocarbons in surface sediments suggest a world-wide background of abiogenic hydrocarbons probably disseminated by airborne transport. This appears to indicate that contamination reaches even remote parts of the world in relatively undiminished quantities. (Auth. mod.)

B-29834

Lisovenko, L.A., Svetlov, M.F., **Some data on the biology of *Paraliparis* (Family Liparidae) of the South Shetlands,** *Journal of ichthyology,* 1980 20(1), p.131-135, 11 refs. For Russian original see B-24545.

DLC SH1.V713

94 specimens of *Paraliparis* sp. were taken in a bottom trawl at 425 m near the South Shetland Islands. Size, maturity and reproduction were studied. They are apparently a bottom pelagic fish. They feed primarily on near-bottom and benthic organisms and have much in common biologically with representatives of the family. The species studied is distinguished by its large roe, up to 6 mm in diameter, and its low fertility—37-159 eggs. Together with large oocytes in the ovaries there are small oocytes (diameter 0.3-2.5 mm) at a trophoplasmic stage. The large ones must be the products of the current year's sex cells, the small ones, next year's. (Auth.)

B-29835

Beniaz, K., Popek, B., Szimonović, I., **Gametogenesis and fecundity in *Trematomus bernacchii*,** *Journal of ichthyology,* 1980 20(2), p.134-139, 6 refs.

DLC SH1.V713

Physical characteristics and reproductive processes of *Trematomus bernacchii* are examined and discussed, primarily because it is part of the Nototheniid family which, as a group, is very abundant and has a significant commercial value.

B-29836

Tarverdieva, M.I., Pinskaia, I.A., **Feeding of fishes of the families Nototheniidae and Chaenichthyidae on the shelves of the Antarctic Peninsula and the South Shetlands,** *Journal of ichthyology,* 1980 20(4), p.50-60, 7 refs. For Russian original see B-25399.

DLC SH1.V713

Many of the fishes analyzed (75-80%) are planktivorous. Their main food is *Euphausia superba* which is a dominant element off the Antarctic Peninsula. In this region a great similarity is noted in the food composition of fishes. Off the South Shetlands the similarity in the food composition is not so great. Here, in addition to *E. superba,* Salpae, Gammaroidea and Hyperiidae, are found organisms common to most fish species, though to a lesser degree than *E. superba.* The feeding intensity of fish in the regions investigated is fairly high, particularly in the region where there is a great comsumption of *E. superba;* in fish of the family Nototheniidae it is higher than in fish of the family Chaenichthyidae. (Auth.)

B-29837
Gerasimchuk, V.V., Piotrovskiĭ, A.S., **Find of a rare fish *Aethotaxis mitopteryx* DeWitt, 1962 (Nototheniidae, Osteichthyes) in the Indian sector of the Antarctic,** *Journal of ichthyology,* 1980 20(4), p.138-140, 4 refs. For Russian original see B-25400.
DLC SH1.V713

Morphological and meristic characters of *A. mitopteryx* caught 5-15 m off the ground in 390-450 m deep water at Olav-Prydz Bay are given in tabular form in comparison with the holotype (DeWitt, 1962) and with the specimen described by A.N. Kotliar (1978). The new record provides further evidence for the circumantarctic range of the species. (Auth.)

B-29843
Semina, G.I., Golikova, G.S., Nagaeva, G.A., **Phytoplankton in the South Atlantic in November-December 1971** [Fitoplankton iuzhnoĭ chasti Atlanticheskogo okeana v noiabre-dekabre 1971g.], *Akademiia nauk SSSR. Institut okeanologii. Trudy,* 1982 Vol.114, p.5-19, In Russian with English summary. Refs. p.17-19.

As a result of light and scanning electron microscopic analysis of 208 phytoplankton samples taken at 28 stations along 3 sections a total of 157 species were recorded of which 103 were diatoms, 50 peridineans, 3 silicoflagellates and 1 flagellate. The abundance and biomass of phytoplankton were found to be particularly high south of the Antarctic Convergence. Biogeography of the species is considered.

B-29851
Arnaud, P.M., Bandel, K., **Comments on six species of marine antarctic Littorinacea (Mollusca, Gastropoda),** *Téthys,* 1976(1978) 8(3), p.213-230, With French summary. Refs. p.228-230.
DLC QH301.T48

In contrast to temperate and tropical littorinid species, the antarctic ones are living only in tide pools or below the intertidal zone. A study of their phylogenetic relations on the basis of their radular morphology shows a mixing of littorinid and lacunid peculiarities, including transitional forms between the two families. So the present habit of the antarctic littorinidae to live below sea surface may be considered as the ancestral way of life in the whole family. The embryonic shell, examined in three species, indicates the young animals hatching out as miniature adults, a feature already known in the arctic Littorinidae. Finally, it is shown that the shell structure is typically that of the lower Mesogastropoda. (Auth.)

B-29852
Ledoyer, M., ***Thymopides grobovi* (Burukovski and Averin, 1976). (Crustacea, Decapoda, Nephropidae). Collected at Kerguelen Islands during the 1974 and 1975 cruises of the M.S. *Marion Dufresne*** [*Thymopides grobovi* (Burukovski et Averin, 1976). (Crustacea, Decapoda, Nephropidae). Récolté aux iles Kerguelen au cours des campagnes du M.S. *Marion Dufresne* en 1974 et 1975], *Téthys,* 1979 9(2), p.123-128, In French with English summary. 4 refs.
DLC QH301.T48

During recent cruises of the M.S. *Marion Dufresne* some specimens of a Decapoda Nephropidae were caught in deep waters near Kerguelen Islands. These specimens are referred to the species *Thymopides grobovi* (Burukovski and Averin) even though some differences are observed with the original description. (Auth.)

B-29853
Kusakin, O.G., Vasina, G.S., **Additions to the marine Isopoda and Gnathiida of Kerguelen Islands (southern Indian Ocean),** *Téthys,* 1980 9(4), p.355-369, With French summary. Refs. p.367-369.
DLC QH301.T48

This report deals with Isopoda and Gnathiida from coastal waters of Kerguelen Islands collected by French expeditions in 1964, 1966, 1968 and mostly in 1970 from depths between 0 and 200 m. Twenty eight species of Isopoda and 2 species of Gnathiidae were identified. One new species is described *Austrofilius arnaudi.* Six species are shown to be new for the Kerguelen region. (Auth.)

B-29854
Nikolaev, V.A., **Method of preparing diatom algae for light and scanning electron microscopes** [K metodike prigotovleniia preparatov diatomovykh vodorosleĭ dlia svetovogo i skaniruiushchego elektronnogo mikroskopov], *Botanicheskiĭ zhurnal,* 1982 67(12), p.1677-1680, In Russian. 4 refs.
DLC QK1.V713

A method for preparing diatoms for light and scanning electron microscopy is described. Developed for studying antarctic diatoms, it is also suitable for studies of fossil diatoms and pollen grains.

B-29874
Trivelpiece, W.Z., **Ecological studies of pygoscelid penguins and antarctic skuas,** Syracuse, State University of New York, 1981, 136p., University Microfilms order No. 81-18126, Ph.D. thesis. Refs. p.118-131.

Investigations are reported of the reproductive ecology of the Adélie, Chinstrap and Gentoo penguins. The breeding ranges of the three species are largely allopatric except in the area of the Antarctic Peninsula where heterogeneous pygoscelid rookeries occur at several locations. The effect of differing feeding strategies on the reproductive cycles of the sympatrically breeding Brown and South Polar skuas are also examined. Brown skuas feed on penguin eggs and chicks and breed significantly earlier than South Polar skuas, which feed at sea on krill, fish and amphipods. It is proposed that a multi-species approach be implemented to monitor the impact of human harvesting of the antarctic krill stock. Penguins have several attributes that make them ideal indicators of perturbations in the antarctic food web, and Chinstrap penguins, in particular, possess several qualities that suggest they play a key role in future monitoring studies. (Auth.)

B-29877
Fischer, J.K., **Volume concentration of nannosestone as a measure of protein content in suspensions of oceanic surface waters,** *Polskie archiwum hydrobiologii,* 1980 27(1), p.1-10, With Polish summary. 12 refs.
DLC QH301.P67

A study was made of the correlation between volume concentration of suspensions (particle diameter 2-40 micron) and protein content in suspensions retained on a glass fibre filter. The correlations found for surface waters of Brasilian and Falkland Currents and for antarctic surface water were nearly identical. Studies were performed between Jan 1977 and Feb 1977, at 49 sampling stations, during the II Antarctic Expedition of R/V *Professor Siedlecki.* (Auth.)

B-29878
Nishimura, K., Kawamura, Y., Matoba, T., Yonezawa, D., **Deterioration of antarctic krill muscle during freeze storage,** *Agricultural and biological chemistry,* Dec.1983 47(12), p.2881-2888, 21 refs.

The effects of freezing on the heat-induced gelation, the ATPase activity and myofibril structure of antarctic krill muscle were investigated. Muscle from freshly caught krill was immediately stored at -20 C in the presence (glycerol krill) and absence (frozen krill) of glycerol. Several protease inhibitors were individually added to glycerol krill to inhibit endogenous proteolysis. The examinations were carried out after about 3-month storage at -20 C. In glycerol krill (unfrozen state), viscoelastic parameters of the heat-induced gels and the ATPase activities of all the krill samples were similar to those of "surimi" (raw fish meat paste) of Alaska pollack which gave gel of good quality, although the microstructure (Z-lines) of myofibrils was different among the glycerol krill samples. In frozen krill, however, the parameters of the gel were different from those of "surimi", the ATPase activity was completely lost and disruption of the myofibril structure occurred. Refreezing (-20 C) of glycerol krill after removal of glycerol resulted in a marked decrease in the gelation ability. These results suggest that freezing of krill muscle causes deterioration of the gelation ability. (Auth.)

B-29879

Efremenko, V.N., **Description of the eggs and larvae of *Muraenolepis microps* (Muraenolepidae) from the Scotia Sea,** *Journal of ichthyology,* 1983 23(1), p.139-142, Translated from Voprosy ikhtiologii. 6 refs.

The morphological description of the eggs and larvae of *M. microps* and their distribution off South Georgia is presented. Spawning of *Muraenolepis microps* is brief at the end of winter, above the steep slope, in deep, warmer water, at a depth of more than 200 m in the Scotia Sea. The eggs are pelagic. Hatching of prolarvae takes place during the earliest part of spring above the steep slope in the deep, warmer water. The unformed and fully formed larvae are found during the spring-summer period above the shelf and steep slope in the 100 m surface zone.

B-29880

International Whaling Commission, **Thirty-third report of the International Whaling Commission,** Cambridge, England, 1983, 782p., Refs. passim. For selected papers see B-29880 through B-29893.

DLC SH381.I484

The report contains materials from the following meetings: the Fourth Special Meeting of the Commission; the 33rd Annual Commission and Scientific Committee meetings; and Special Scientific Committee Meeting on Western North Pacific Sperm Whale Assessments. In addition to the reports of these meetings, sixty-seven scientific papers are included, thirteen of which are reports of studies carried out in the Southern Hemisphere.

B-29881

Chapman, D.G., **Some considerations on the status of stocks of Southern Hemisphere minke whales,** *International Whaling Commission. Report,* 1983 No.33, p.311-314, 12 refs.

DLC SH381.I484

Some of the unresolved problems of the status of Southern Hemisphere minke whale stocks are reviewed. It is noted that there is a substantial density gradient within the zone in which minke whales have been primarily exploited, and it is shown that this can bias catch per unit of effort as a measure of density. This in turn throws doubt on the procedure heretofore used to estimate populations and replacement yields through the BALEEN program. An alternative approach to obtaining estimates of replacement yield is through the estimation of net recruitment from age data. This estimation may be invalid if there is bias in the age readings or if recent age distributions are not stable. Finally, estimates of RII given by Allen (1981) are used to estimate net recruitment rate. The estimate so obtained is imprecise and subject to several criticisms. (Auth.)

B-29882

Beek, J.G. van, **Note on the accumulated southern minke whale catch distributions with regard to stock boundaries,** *International Whaling Commission. Report,* 1983 No.33, p.315-321, 10 refs.

DLC SH381.I484

The Sub-committee on Minke Whales has thoroughly discussed the issue of the southern minke whale stock divisions in recent meetings. The variables used included accumulated catches by 10 deg longitudinal strip or square and differences in biochemical characters. In this paper the accumulated catches of Japan and the USSR are presented and analysed by 1 deg longitudinal strip for two periods: 1971-74 and 1975-80, without and with catch allocations, respectively. The analysis primarily focuses on the boundaries between Area III + IV (70 E) and IV + V (130 E). A decline in catches was found around the 70 E and 130 E strip in both periods. During the first period catches on both sides were varying and not high, thus a proper boundary choice was impossible. In the second period catches were high in adjacent strips. The explanation is put forward viz. the catch position recording procedure—the noon position of the factory ship was recorded—in relation with an operational measure (presumably in order to prevent confusion about catches by Area). The paper concludes that on the basis of accumulated catch data, no unequivocal evidence exists which supports the hypothesis that the 70 E and 130 E Area boundaries are stock boundaries. (Auth.)

B-29883

Cooke, J.G., De la Mare, W.K., **Effects of variability in age data on the estimation of biological parameters of minke whales *(Balaenoptera acutorostrata),*** *International Whaling Commission. Report,* 1983 No.33, p.333-338, 14 refs.

DLC SH381.I484

Previous authors analysing biological data from catches of minke whales in the Antarctic have concluded that the age at sexual maturity has declined markedly between 1930 and 1970, that the steep slopes of age distributions in the catches are evidence of either a high rate of increase or a high natural mortality rate, and that the data on ovulation rates agree well with the high pregnancy rates amongst females in the catches. These findings are reconsidered in the light of the variability inherent in the data. It is concluded that the apparent decline in the mean age at sexual maturity may be an artifact of the data. Explanations of the age distributions consistent with the observations of ovulation and pregnancy rates are also proposed. Finally, it is concluded that the evidence for any change in the biological parameters or recruitment rate of the Southern Hemisphere minke whale over the years requires closer examination. (Auth.)

B-29884

Cooke, J.G., De la Mare, W.K., **Analysis of Southern Hemisphere minke whale catch and effort data,** *International Whaling Commission. Report,* 1983 No.33, p.347-351, 6 refs.

DLC SH381.I484

The procedure used for the analysis of Southern Hemisphere minke whale catch and effort data at the last few meetings of the IWC Scientific Committee is evaluated critically and a number of errors are identified which result in the estimated corrected catch per unit effort (CPUE) series bearing little relation to the true CPUE. An alternative method for analysing the data is suggested. (Auth.)

B-29885

Kato, H., Shimadzu, Y., **Foetal sex ratio of the antarctic minke whale,** *International Whaling Commission. Report,* 1983 No.33, p.357-359, 19 refs.

DLC SH381.I484

The sex ratio of 12,022 foetuses from minke whales taken in the Atlantic is examined. When the foetuses were classified into 10 cm length groups, the sex ratio was 1:1 for all except the 1-10 cm group where the difference was statistically significant. Possible reasons for this are discussed. It is concluded that the foetal sex ratio in each Area and for the whole Antarctic is 1:1. (Auth.)

B-29886

Kasamatsu, F., Miyashita, T., **Abundance of minke whales in mid latitudinal waters of the Southern Hemisphere in the austral summer,** *International Whaling Commission. Report,* 1983 No.33, p.373-377, 11 refs.

DLC SH381.I484

Despite the wide distribution of minke whales in the Southern Hemisphere, estimates of abundance have generally only been made for the waters south of 60 S. Japanese scouting boats sighted 6,197 whales in 920,232 n. miles searching between 40 S and 60 S in January and February from 1965/66-1981/82. This paper estimates the abundance of minke whales in these waters using a line transect method. The total abundance of minke whales in the waters 50 S-60 S was estimated at 123,600 (exploitable population 69,200). The corresponding figures in the 40 S-50 S area were 15,800 and 4,700. (Auth.)

B-29887

Miyashita, T., **Estimate of the population size of the antarctic minke whale using various mark recapture methods,** *International Whaling Commission. Report,* 1983 No.33, p.379-382, 13 refs.

DLC SH381.I484

A total of 2,884 minke whales have been effectively marked by the International Marking Scheme in the Southern Hemisphere from 1975/76 to 1981/82 and 38 have been recaptured up to the end of the 1981/82 season. In this paper the population sizes of the Antarctic minke whales are estimated using various mark recapture methods. The results can be summarized as follows. Area I: 31,000, Area II: 40,000, Area III: 135,000, Area IV: 135,000, Area V: 139,000, Area VI: 13,000.

B-29888

Shimadzu, Y., Ohsumi, S., Katabami, Y., **Revised effort statistics for minke whaling by Japanese expeditions in the Antarctic,** *International Whaling Commission. Report,* 1983 No.33, p.383-387, 7 refs.

DLC SH381.I484

Japanese effort data for Antarctic minke whaling from 1971/72 to 1981/82 are compiled. Where the original measurements are available, the logical sequence of recorded events is checked by computer. Definitions of each segment of the time budget are reviewed and explained. (Auth.)

B-29889

Shimadzu, Y., Kasamatsu, F., **Operating pattern of antarctic minke whaling by the Japanese Expedition in 1981/82,** *International Whaling Commission. Report,* 1983 No.33, p.389-391, 4 refs.

DLC SH381.I484

The Japanese expedition took minke whales in the Antarctic for 131 days from 17 November 1981 in Areas III-VI. A total of 3,755 whales were caught, fulfilling the allocated quota. This season was characterized by the northerly position of the pack ice edge in Areas IV (western half), III and VI, which resulted in a lower female sex ratio in the catch and lower catch per unit effort values. This agrees with previous operations. The necessity of information on the ice edge location for interpreting catch per unit effort data is stressed. (Auth.)

B-29890

Kato, H., **Some considerations on the decline in age at sexual maturity of the antarctic minke whale,** *International Whaling Commission. Report,* 1983 No.33, p.393-399, 20 refs.

DLC SH381.I484

The decline in age at sexual maturity (tm) of the antarctic minke whale was examined using three approaches: the transition phase in ear plugs, the relationship between age and percentage of animals sexually mature, and the relationship between age and the number of ovulations, based on the data collected by Japanese whaling expeditions. (i) The examination of the transition phase in the ear plugs (taking into account the bias due to truncated sampling problems) showed a decline in tm from 14-15 years (1945 year class) to 7 years (1965 year class) in both sexes. The same phenomenon was observed when data were converted from year class to year of maturation, but the decline was not so great. (ii) A constant trend in age at sexual maturity for females was observed at around 6 years from the 1965 to 1972 year classes. (iii) Examination of the age at first ovulation also suggested a decline in tm from the 1952-54 to 1967-69 year classes. Thus a decline in tm in advance of the substantial exploitation was confirmed by three different approaches. Furthermore, this is supported by other changes observed in the Antarctic ecosystem, notably a decline in tm of crabeater seals and increasing population sizes of several penguin species. (Auth.)

B-29891

Tanaka, S., Shimadzu, Y., **Replacement yield to stabilize a population,** *International Whaling Commission. Report,* 1983 No.33, p.401-402, 4 refs.

DLC SH381.I484

A review of the basic concept of replacement yield (RY) reveals the recent approximation method employed by the Scientific Committee to be biased. A new model is developed to calculate RY which guarantees that the population after a certain period will remain at the same level as in the starting year under a regime of constant catches. This constant catch is called the 'RY to stabilize the population'. An example for Antarctic Area IV minke whales is given. (Auth.)

B-29892

Doi, T., Kasamatsu, F., Nakano, T., **Further simulation studies on sighting by introducing both concentration of sighting effort by angle and aggregations of minke whales in the Antarctic,** *International Whaling Commission. Report,* 1983 No.33, p.403-412, 13 refs.

DLC SH381.I484

A model for estimating sighting rate is reviewed and three particular problems are examined: the topman's tendency to sight more frequently towards the trackline; the effect of the tendency of minke whale to aggregate; and the reaction of the whales to a vessel. Results are tabulated.

B-29893

Cooke, J.G., De la Mare, W.K., Beddington, J.R., **Stock estimates for Southern Hemisphere sperm whales using the Beddington-Cooke length-specific technique,** *International Whaling Commission. Report,* 1983 No.33, p.725-729, 12 refs.

DLC SH381.I484

Stock estimates for Southern Hemisphere sperm whale Divisions 2 to 8 are obtained using the Beddington-Cooke length-specific technique which utilizes the changing size distribution of male catches as an indicator of stock depletion. Only Divisions 2 and 3 appear to be sufficiently depleted to give reliable initial stock estimates. The results for Divisions 3 and 5 cast doubt on the validity of the La Jolla sperm whale model which was used for these assessments. (Auth.)

B-29895

Baharaeen, S., **Evolution of antarctic yeasts,** Stillwater, Oklahoma State University, 1982, 147p., University Microfilms, order No. 83-04840, Ph.D. thesis. 155 refs.

Reported are morphological investigations of an ecologically interesting group of yeasts, psychrophiles or psychrotrophs isolated from frigid habitats: *Cryptococcus bhutanensis* Goto and Saito, *C. himalayensis* Goto and Saito, *C. vishniacii* Vishniac and Hempfling, and *Leucosporidium scottii* Fell, Statzel, Hunter, and Phaff. *Cryptococcus vishniacii* is the only heterotroph known to be indigenous to the Dry Valleys of Antarctica; *L. scottii* is the yeast most commonly reported from sites outside of the Dry Valleys. The three *Cryptococcus* species were not only morphologically very similar, but they displayed a constellation of budding characters not previously reported in yeasts. (Auth.)

B-29896

Brand, T.E., **Trophic interactions and community ecology of the shallow-water marine benthos along the Antarctic Peninsula,** Davis, University of California, 1980, 220p., University Microfilms order No. 81-11976, Ph.D. thesis. Refs. p.208-220.

Shallow water Antarctic benthic marine communities are composed primarily of trophic generalists that consume relatively unstable food items. Benthic trophic resources, including organic detritus and macroalgae, are found to be more stable through time than previously believed. This may explain why the majority of polar species produce non-planktonic larvae or are viviparous. It may also account for the large number of organisms that reproduce during the austral winter. Low species diversity in polar systems is probably the result of several factors, including the Antarctic Convergence which prevents invasion by homogeneity of the Antarctic province as a whole. (Auth.)

B-29906

Daniels, R.A., **Demographic characteristics of an antarctic plunderfish, *Harpagifer bispinis antarcticus*,** *Marine ecology progress series,* Aug.30, 1983 13(2-3), p.181-187, 43 refs.

Harpagifer bispinis antarcticus Nybelin is demonstrated to be a relatively long-lived, slow-growing fish inhabiting shallow-water embayments on the Antarctic Peninsula. Age of 153 fishes taken between March and December, 1975 in Arthur Harbor, Anvers Island, was determined from otoliths. Growth rates were estimated from annuli back-calculation and using a Brody-von Bertalanffy model. Nine yr old fish were collected; annual growth increments ranged between 4 and 10 mm for both sexes. Growth curves of the Arthur Harbor population were similar between the sexes but differed from those of a population in Paradise Harbor. Survivorship for males and females was high, approximately 75%; instantaneous mortality averaged 0.25 for females and 0.22 for males. Population structure appeared stable through the sample period; recruitment of 3 yr old fish was most common in late autumn-early winter. Formation of the annulus occurs during the austral winter, at the same time these fish spawn, and may be associated with this event rather than decreased feeding or activity. (Auth.)

B-29908

Kilarski, W., Śmialowska, E., Friedhuber, A., **Histological analysis of fibres in myotomes of antarctic fish. 2. Morphometry of muscle fibres and capillaries,** *Zeitschrift für mikroskopisch-anatomische Forschung,* 1982 96(5), p.791-801, For part I see 13B-26633. 21 refs.

In a survey of nine species of antarctic Teleosts belonging to the families Chaenichthyidae (two species) and Nototheniidae (seven species) the surface density (Sv), volume density (Vv), number of muscle fibres and capillaries in 0.1 sq mm area and the diameters of capillaries were estimated. Muscle fibre to capillary ratio (C:F) and streamlinedness (l/h) of the fish were also calculated. Sv values of the muscle fibres are inversely correlated with streamlinedness of the fish. However, this relation is disturbed in fish with low metabolic activity. It is concluded that muscles of white-blooded fish are morphologically adapted to the lack of hemoglobin and myoglobin by: relatively large diameters of their capillaries, but not by their density, and by the low Sv values of their muscle fibres. (Auth. mod.)

B-29910

Newell, I.M., **Antarctic Halacaroidea,** *American Geophysical Union. Antarctic research series,* Apr. 6, 1984 Vol.40, Biology of the antarctic seas, No.15, 284p., Refs. p.281-284.

DLC QH95.58.B56 vol.15

The Halacaroidea (Acari) from the Antarctic and sub-Antarctic (including Tierra del Fuego, Falkland Islands, South Georgia, South Sandwich Islands, Kerguelen, Macquarie Islands, and Auckland Island) are described. Halacaroidea from north of latitude 50 S are treated when zoogeographically significant. Species from Chile and the Southeast Pacific are included, and a few species recorded from Peru and South Africa. Mites were collected from a variety of intertidal and subtidal habitats to a depth of 4100 m. Three subfamilies are raised to the corresponding family ranks and the generic composition of two groups is changed. Fifteen genera are diagnosed. Three new genera are proposed; 115 new species are described; six new synonymies are established; three subspecies are given specific status; and three species are renamed. Tabular keys to the genera and species are presented, the structure of the Halacaroidea is reviewed, and techniques for collecting, sorting, and mounting Halacaroidea are suggested. (Auth. mod.)

B-29911

Vishniac, H.S., Baharaeen, S., **Five new basidioblastomycetous yeast species segregated from *Cryptococcus vishniacii* emend. auct., an antarctic yeast species comprising four new varieties,** *International journal of systematic bacteriology,* Oct. 1982 32(4), p.437-445, 17 refs.

Descriptions of five new yeast species are given as are the methods and materials used. A discussion of the difficulties associated with microbe taxonomy is included.

B-29912

Skinner, J.D., Van Aarde, R.J., **Observations on the trend of the breeding population of southern elephant seals, *Mirounga leonina*, at Marion Island,** *Journal of applied ecology,* Dec. 1983 20(3), p.707-712, 19 refs.

The annual haulout pattern of adult southern elephant seal cows is described by polynomial functions with differences in the rate of haulout and the asymptote attained resulting in the coefficients and constants of the functions being different. An analysis of data collected during nine breeding seasons from 1973 to 1982 indicated an overall decrease of 11.0 and 8.0% for the adult bull and cow components of the population breeding at Marion Island. The number of cows hauling out to produce pups is exponentially related to the number of adult bulls present on land during the year of fertilization. The overall decrease in the population may therefore be ascribed to factors responsible for a decrease in bull numbers. (Auth.)

B-29913

Williams, A.J., **Chick-feeding rates of Macaroni and Rockhopper penguins at Marion Island,** *Ostrich,* Sep. 1982 53(3), p.129-134, 18 refs.

The chick-rearing period of both Macaroni Penguins *Eudyptes chrysolophus* and Rockhopper Penguins *E. chrysocome* at Marion Island was 70 days. In this period chicks of both species each received approximately 30 meals, each meal representing one parental foraging trip. Female parents made 22 foraging trips, including all trips in the first 30 days after the chick hatched, and male parents made eight trips. The chicks fasted between meals and in both species 50% of fasts lasted 24-48 h and 93% lasted less than 96 h. The duration of fasts changed in the course of chick-rearing but the pattern of fasting was remarkably similar in the two species. Maximum weight increases following a meal were 0.65 kg in Rockhopper and 2.0 kg in Macaroni Penguin chicks. The estimated total amount of food received by individual chicks during the entire chick-rearing period was 15 kg in Rockhopper and 33 kg in Macaroni Penguins. An estimated 8,800 tons of krill is required to feed the annual production of chicks of these two species at Marion Island. (Auth.)

B-29914

Griffiths, A.M., **Reactions of some sea birds to a ship in the southern ocean,** *Ostrich,* Dec. 1982 53(4), p.228-235, 12 refs.

Birds were categorized according to the distance at which they were seen from the moving ship. The proportions of individuals of each species following the ship, as opposed to flying past it, were calculated. Few species allow accurate censuses of their abundance. The time spent following by individual birds is discussed with respect to "turn-over rates" of ship-following species. Species strongly attracted to the ship were scavengers. Food is believed to be the prime factor influencing the attraction of seabirds to ships, although albatrosses may have followed to use air currents generated by the ship. Within an hour of the ship stopping most species had increased in abundance. The implications of assessing avian abundance and biomass from a stationary ship are discussed. While the observations were being made, the ship covered the sector bounded by 20W-40E between 35S and 70S. (Auth. mod.)

B-29915

Drescher, H.-E., Welsch, U., **Fine structure of the parabronchi and the gas exchange area of the Adélie penguin lung,** *Zeitschrift für mikroskopisch-anatomische Forschung,* 1983 97(5), p.863-872, 12 refs.

The parabronchi of the Adélie penguin are endowed with wide atria forming pockets between a loose meshwork of bundles of smooth muscle cells lining the parabronchial lumen. The atrial epithelium is of variable thickness and bears numerous microvilli, which are overlain by/or embedded in sheets or whorls of lamellar material forming layers of very variable thickness. The cells contain either stacks or whorls of this material or roundish lamellated bodies, and are interconnected by desmosomal contacts as well as what presumably represent tight junctions. Underneath the epithelium and within the bundles of muscle cells nerve fibres have been found regularly. The diameter of the morphological air blood barrier is about 165-210 nm in thin areas, excluding a 12-20 nm thick layer covering the luminal plasma membrane of the air capillary epithelium. The blood capillary endothelium ordinarily is markedly thicker (40-250 nm) than the air capillary epithelium (17-25 nm). The basal lamina between endo- and epithelium is a uniform structure measuring about 95-105 nm. The endothelial cells are interconnected by desmosomal and probably tight junctions. (Auth.)

B-29918

Howarth, O.W., Rickard, T.M.A., Sainsbury, M., **Antarctic lichens. 1. The stereochemistry of 7beta-Acetoxy-22-hydroxyhopane from *Pseudocyphellaria freycinettii,* indigenous to S. Georgia,** *OMR; organic magnetic resonance,* Jan. 1983 21(1), p.56-59, 9 refs.

From differential spin decoupling and nuclear Overhauser enhancement experiments, the 400 MHz 1H NMR spectrum of the triterpene 7beta-acetoxy-22-hydroxyhopane is interpreted to establish the alpha-configuration of the side-chain at C-21. (Auth.)

B-29921

Lowry, J.K., Fenwick, G.D., **Shallow-water gammaridean Amphipoda of the subantarctic islands of New Zealand and Australia: Melitidae, Hadziidae,** *Royal Society of New Zealand. Journal,* Dec. 1983 13(4), p.201-260, Refs. p.247-250.

The marine melitid and hadziid amphipods of The Snares, the Auckland Islands, Campbell Island and Macquarie Island are reported from collections made between 1961 and 1980. The number of melitid species known from these islands is increased from 3 to 14. Two new genera and 4 new species are described: *Ceradocopsis macracantha, Gammarella hybophora, Hoho hirtipalma* and *Tagua aporema.* All 13 species from The Snares are new records; 5 of the 8 species from the Auckland Islands are new records; all of the 8 species from Campbell Island are new records; and the occurrence of *Ceradocopsis kergueleni* at Macquarie Island is the first record of a melitid amphipod from that island. A new genus and species of hadziid amphipod, *Zhadia subantarctica,* is reported from the Auckland Islands. (Auth.)

B-29922

Lowry, J.K., Stoddart, H.E., **Shallow-water gammaridean Amphipoda of the subantarctic islands of New Zealand and Australia: Lysianassoidea,** *Royal Society of New Zealand. Journal,* Dec. 1983 13(4), p.279-394, Refs. p.391-394.

The lysianassoid amphipods of The Snares, the Auckland Islands, Campbell Island and Macquarie Island are reported from collections made between 1961 and 1980. The number of lysianassoid species known from these islands is increased from 4 to 24. Fifteen of the 16 species recorded from The Snares are new records, as are 4 of the 6 species from the Auckland Islands, 11 of the 12 species from Campbell Island and 3 of the 6 species from Macquarie Island. Three groups of genera are recognised within the Lysianassoidea. The lysianassid and uristidid groups (after Hurley 1963) are used and a new group, the conicostomatid group, is established with 9 genera. In this group two new genera are proposed, *Conicostoma* and *Scolopostoma,* and 3 new species are described: *Acontiostoma tuberculata, Stomacontion hurleyi* and *S. pungapunga.* (Auth. mod.)

B-29923

Sieg, J., **Tanaidomorpha (Crustacea: Tanaidacea) from the Ross Sea, Antarctica,** *Royal Society of New Zealand. Journal,* Dec. 1983 14(3), p.395-418, 26 refs.

Seven species of tanaids collected from Franklin, Ross and White Islands, including four new species, of which two belong in new genera, are described: *Andrognathia plumosa* n. gen. et sp., *Typhlotanoides insolitus* n. gen. et sp., *Pseudoparatanais antarcticus* n. sp. and *Leptognathia diversa* n. sp. Distributions of the remaining three species are discussed. (Auth.)

B-29931

Markle, D.F., Williams, J.F., Olney, J.E., **Description of a new species of *Echiodon* (Teleostei: Carapidae) from antarctic and adjacent seas,** *Biological Society of Washington. Proceedings,* 1983 96(4), p.645-657, 15 refs.

E. cryomargarites n.sp., a previously unrecognized species of carapid fish, is described from adult and larval specimens collected in relatively deep water from the Antarctic and adjacent seas. This species differs from *E. exsilium* and *E. dawsoni,* which have fewer precaudal vertebrae, and from *E. dentatus* and *E. drummondii* which have slightly higher D30 [dorsal ray] counts, fewer pectoral rays and fewer vertebrae to the origin of the dorsal fin. The new species has a relatively deep, flaccid body and was collected over bottom depths ranging from 400-1200 m off Argentina, South Georgia and New Zealand. Two other specimens that differ slightly in geographic and depth distribution, appearance, and have a shallow, firm body were caught at depths of 1500-1666 m off southern Chile. The distal tips of the transverse processes of the first 2 vertebrae in *E. cryomargarites* are ligamentously attached to paired sclerified structures of the anterior swimbladder. This condition may represent a precursor to the rocker bone specialization of Onuxodon. (Auth.)

B-29932

Lair, N., Koste, W., **Rotifer fauna and population dynamics of Lake Studer 2 (Kerguelen Archipelago) with description of *Filinia terminalis kergueleniensis* n.sp. and a new record of *Keratella sancta* Russel 1944,** *Hydrobiologia,* 1984 108(1), p.57-64, 21 refs.

F. t. kergueleniensis n.sp. (Family *Filiniidae* Bartos 1959), from Lake Studer 2 is described and figured. *F. t. kergueleniensis* differs from the type in length of bristles and their insertion. *K. sancta* was found again; it is the 3rd record after its discovery by Russel 1944 in New Zealand. *Notholca* cf. *jugosa* Gosse 1889 is also found in the plankton of the subantarctic lake. The new subspecies and *K. sancta* occur all year round, while *Notholca* cf. *jugosa* is sporadic. Population dynamics appear to be dependent on changes in temperature and chlorophyll content. The relative contribution of these three species to community biomass from their numerical abundance and measured volumes was estimated. The major community biomass peak lasts from March to June with a secondary maximum between October and January. (Auth.)

B-29940

Bonner, W.N., **Seals and man: a study of interactions,** Seattle, Washington sea Grant, University of Washington Press, 1982, 170p., Numerous refs.

DLC QL737.P6B68 1982

The book gives a detailed account of the development and evolution of seals, distinguishing characteristics of various species, behavior patterns, social and feeding habits and preferences, morphology, geographic distribution, early predation by man and rules established by man to prevent decimation of the herds, and later predation which almost eliminated the seals. Chapters 4, 5, and 6 deal with the fur seals of the Southern Hemisphere; the southern elephant seals and the elephant oilers; and the antarctic seals, an unexploited resource. Chapters 4 and 5 emphasize the exploitation aspects of the 18th, 19th, and 20th centuries while Ch. 6 describes various species in the Antarctic with data on species populations.

B-29941

Moscow. Vsesoiuznyĭ nauchno-issledovatel'skiĭ institut morskogo rybnogo khoziaĭstva i okeanografii, Liubimova, T.G., ed, **Antarctic krill –biology, ecology, and distribution,** New Delhi, Amerind Publishing Co., 1984, 230p., TT 82-00-100, Unpublished manuscript. Refs. passim. For Russian original see 12B-25302. For individual papers see B-29942 through B-29952 and M-29953.

Eleven papers on the physiology, ecology, and population dynamics of krill are presented. The final paper discusses the international regime under the Antarctic Treaty regulating research and development of marine biological resources.

B-29942

Maslennikov, V.V., **Present concepts on the large-scale circulation of the antarctic waters and routes of the large-scale drift of krill,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.1-20, TT 82-00-100, Refs. p.16-20. For Russian original see 12B-25303.

Based on many literary sources representing modern concepts of peculiarities of the horizontal circulation of Antarctic water and on data obtained in the expeditions on board in the Antarctic a map of surface currents has been compiled. Special attention is paid to data on circulation of the water of the so-called high-latitude modification off the Antarctic coast. Proceeding from well-known ideas on the main habitat of *E. superba* a hypothetical distribution pattern of krill in the Antarctic is presented. Zones of interaction between the near-continental water and the Antarctic Circumpolar Current seem to be associated with localities characterized by the maximum abundance of *E. superba* and the routes of its mass drift.

B-29943

Bogdanov, M.A., Soliankin, E.V., Rodionov, S.N., **Spread of the mixed waters of the secondary front zone in the Scotia Sea and the distribution of krill concentrations,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.21-33, TT 82-00-100, Refs. p.32-33. For russian original see 12B-25304.

Based on the data obtained in the hydrographic survey in the southern part of the Scotia Sea on board *Akademik Knipovich* in the summer of 1979, a map of geostrophic currents of this important fishing area is drawn up in detail. The structural peculiarities of the current field are distinctly reflected in the distribution of various physical and chemical characteristics inherent in mixed waters from the so-called secondary frontal zone (SFZ). A rather broad deviation of mixed water northward and southward of the axial position of the SFZ is noted. A broad spectrum of various modifications of Antarctic water in the formation of the SFZ is revealed. Swarms of krill are associated with the distribution of mixed water of the SFZ.

B-29944

Popkov, V.V., Elizarov, A.A., **Stability of the waters in the trophogenic layer as an index of the spatial heterogeneity of bioproductivity in the Pacific sector of the Antarctic,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.34-46, TT 82-00-100, 19 refs. For Russian original see 12B-25305.

Analysis of distribution of stable water has been made on the basis of data obtained at 700 hydrographic stations in the Pacific Antarctic in summer (January-March, 1970-1977). Three areas with high stability of water are distinguished. The first area is in the Eastern Pacific extending along the continental slope from the Amundsen Sea to the Palmer Islands, the second area extends along 62-63S from 175E to 155W and the third area lies near the continental slope in the southeast part of the Ross Sea. Of the principal factors (light, the content of biogenic salts, stability of waters) affecting the development and accumulation of phytoplankton in the Southern Ocean only the value of stability of waters fluctuating greatly by areas and years is decisive for spatial non-uniformity in biological productivity of waters in the Pacific Antarctic.

B-29945

Bogdanov, M.A., Soliankin, E.V., Maslennikov, V.V., Popkov, V.V., Rodionov, S.N., **Variability of oceanological conditions and some trends of krill distribution in the western coast region of the Antarctic Peninsula,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.47-62, TT 82-00-100, 7 refs. For Russian original see 12B-25306.

Based on observations conducted on board *Akademik Knipovich* in 1975/1976, 1977/1978 and 1978/1979 a comparative geographical analysis of oceanological conditions is made off the Antarctic Peninsula in the Southeast Pacific in summer. The results provide evidence of distinct annual variations in the form of the horizontal circulation of water in the shelf area and partly on the Antarctic Peninsula slope because of changes in intensity of the Antarctic Circumpolar Current (ACC). The extent of the development of wave character of the southern branch of the ACC and its meandering cause fluctuations in the total stock of krill off the Antarctic Peninsula and affect the distribution pattern of krill swarms.

B-29946

Arzhanova, N.V., Mikhaĭlovskiĭ, IU.A., **Hydrochemical conditions in the areas of commercial concentrations of krill in the southern part of the Scotia Sea and the Pacific sector of the Antarctic,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.63-77, TT 82-00-100, 17 refs. For Russian original see 12B-25307.

Analysis of hydrochemical conditions in the southern part of the Scotia Sea and in the Pacific Antarctic has indicated that such characteristics as the content of silicon in the water and the Si/P ratio are responsible for the position of the zone of mixed water that is the fishing grounds for krill. The zone of mixed water in the area investigated is characterized by the minimum depth of the minimum oxygen layer and the minimum concentration of oxygen in the 150-250 m layer, high horizontal gradients of these values in the northern and southern outlying areas, maximum horizontal gradients in the distribution of silicon in the surface layer, and an Si/P ratio ranging from 20 to 35. Because the ratio is a very reliable index and can be easily determined it is advisable to use it as a criterion for locating krill.

B-29947

Makarov, R.R., **Population composition of krill *Euphausia superba* Dana,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.78-102, TT 82-00-100, Refs. p.97-102. For Russian original see 12B-25308.

Size composition of young and adult specimens of *E. superba* in the southern part of the Scotia Sea and the northern part of the Weddell Sea is reviewed, based on data obtained in VNIRO expeditions conducted from 1965 to 1978. Size composition of *E. superba* in the Scotia Sea and adjacent waters is rather complicated; several size groups of juveniles and adult specimens occur there. The number of these groups varies from year to year. Variations in size groups of specimens which are in the same physiological condition result from the fact that specimens inhabit waters of different spatial modifications which correspond to individual subpopulations of *E. superba.* Size composition of each subpopulation indicates that the span of life of most specimens is, as a rule, 2.5-3 years. Annual variations in the number of size groups found in every expedition are probably caused by different positions of distribution zones of subpopulations. Besides, it should be noted that the habitat was not adequately covered by the investigations.

B-29948

Makarov, R.R., Maslennikov, V.V., Soliankin, E.V., Shevtsov, V.V., **Quantitative distribution and formation conditions of concentrations of krill *Euphausia superba* Dana based on a study of some regions of the Atlantic and Pacific sectors of the southern ocean,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.103-133, TT 82-00-100, Refs. p.128-133. For Russian original see 12B-25309.

Based on the data collected in the VNIRO expeditions distribution of swarms of *E. superba* in the Scotia Sea and adjacent waters is discussed. Small shoals of *E. superba* are united into huge swarms in places where hydrodynamic conditions are favourable. The more stable conditions (chiefly of a cyclonic character), the more consistent is the occurrence of swarms by years. They are topographically associated with waters of high-latitude modifications or localities influenced by such waters. The seasonal dynamics of formation or dispersion of swarms is dependent upon the intensity of transport of krill to such localities and upon the reproductive cycles of *E. superba.*

B-29949

Sysoeva, M.V., Shevtsov, V.V., **Size composition, biological state, and peculiarities of the distribution of krill (*Euphausia superba* Dana) near south Georgia Island in autumn, 1977,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.134-154, TT 82-00-100, 14 refs. For Russian original see 12B-25310.

Based on the data collected off South Georgia, analysis of size composition and biological state of *Euphausia superba* is made. Nonpreserved specimens from 95 hauls were measured and 20 samples of preserved specimens were biologically analyzed. The analysis indicated three size groups of krill. The distribution pattern of all swarms and each size group of *E. superba* in the area is given in detail. Proceeding from these characteristics it is possible to understand what kind of specimens form commercial swarms in the area. It is shown that the fishing situation was very peculiar off South Georgia in 1977.

B-29950

Storozhuk, A.IA., Morozov, N.P., Petukh, S.A., **Some features of the trace elements composition of the antarctic krill (*Euphausia superba* Dana),** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.155-172, TT 82-00-100, 12 refs. For Russian original see 12B-25311.

Using flame atom-absorption spectrophotometry, content of iron, manganese, zinc, copper, nickel, cobalt, strontium, lead and cadmium was determined in 70 krill samples. The samples of both sexes, of different sizes and ages, in different physiological and biochemical conditions were collected in different fishing areas and seasons. Content of trace elements in antarctic krill was variable because of biological heterogeneity of samples. Some difference was found in the content of trace elements in specimens which consumed food and those which did not. The content of zinc, copper, nickel and cadmium in particular was higher in krill from the Bellingshausen Sea than from the Scotia Sea. The content of several trace elements is related to ash and lipid content.

B-29951

Naumov, A.G., Chekunova, V.I., **Intensity of oxygen exchange and the bioenergetic requirement of the antarctic krill,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.173-193, TT 82-00-100, Refs. p.190-193. For Russian original see 12B-25312.

Intensity of oxygen exchange of krill was investigated at temperatures of 2, 5 and 7 C which correspond respectively to the mean temperature recorded in localities known for huge swarms of krill. Equations of dependence of oxygen exchange on body weight are obtained. Results are compared with published data on oxygen exchange intensity. Equations of linear and weight growth of specimens at various stages of maturity are suggested. They are used for calculations of energy expenditures spent on weight growth metabolism, molting and generative metabolism in females. Oxygen exchange intensity is almost constant in the temperature range that corresponds to natural thermal conditions. Respiration increases rapidly when the temperature rises to the extreme values peculiar to areas where *E. superba* is brought out to notal waters. Such conditions are unfavourable for *E. superba* and cannot be endured for long.

B-29952

Liubimova, T.G., Shust, K.V., **Quantitative estimation of the antarctic krill consumed by principal groups of species,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.194-216, TT 82-00-100, Refs. p.210-216. For Russian original see 12B-25313.

An estimate of the quantity of krill consumed by principal groups of species inhabiting the southern ocean or making feeding migrations to the Antarctic water in summer and autumn is given. Based on the analysis of literature and the authors' own data on the assessment of krill consumed by baleen whales, seals, birds, cephalopods and fish in the Antarctic, possibilities of safely exploiting the resources of krill are estimated. The possible catch is tentatively estimated to amount to 60 million t.

B-29954

Summary report on the biological research of krill *(Euphausia superba* Dana) and its fishing ground investigation in the antarctic ocean (November 1982-March 1983), Pusan, Korea, National Fisheries Research and Development Agency, 1983, 24p.

Bathythermographic measurements, surface water temperature and salinity tests, and phytoplankton samplings were conducted to establish a relationship between krill catch and environmental conditions. The best fishing ground was found off Enderby Land, where the water temperature ranged from -0.7 C to 1.4 C at 10 m depth and -1.8 C to 1.3 C at 50 m depth. The relationship between sex, body length and body weight of krill by fishing ground, i.e. Enderby Land, American High Land and Wilkes Land, was also studied. An appendix of summarized data is provided.

B-29955

Sömme, L., **Supercooling and winter survival in terrestrial arthropods,** *Comparative biochemistry and physiology,* 1982 73A(4), p.519-543, Refs. p.540-543.

Species, overwintering habitat, location, lowest mean of supercooling point, cryoprotectant and reference are discussed and presented in six tables for terrestrial arthropods having the ability to supercool as a means of winter survival.

B-29956

Duman, J.G., Horwarth, K.L., Tomchaney, A., Patterson, J.L., **Antifreeze agents of terrestrial arthropods,** *Comparative biochemistry and physiology,* 1982 73A(4), p.545-555, Refs. p.553-555.

Many freeze-susceptible terrestrial arthropods, including antarctic species, employ low molecular weight antifreezes, such as polyols and sugars. These solutes lower the supercooling point of the insect approximately 2x more than they lower the melting point. Proteins, similar to the antifreeze proteins and glycoproteins of polar marine fishes, which produce a thermal hysteresis (differences between freezing and melting points) of several degrees function as antifreezes in a number of insects, spiders and a centipede. In some species these proteins are the only identifiable antifreezes, while in other species polyols are also produced. Temperature and photoperiod are the most important environmental cues used to trigger the production and loss of the thermal hysteresis proteins (THP's). The physiological timing processes which control antifreeze levels involve the insect's circadian system. Several insect THP's have now been purified and their compositions analyzed. In general, these insect THP's have more hydrophilic amino acids and a much lower alanine content than fish THP's. Perhaps the most interesting of the insect THP's is one from *Tenebrio molitor,* which contains 28% cysteine residues. (Auth.)

B-29957

Baust, J.G., **Environmental triggers to cold hardening,** *Comparative biochemistry and physiology,* 1982 73A(4), p.563-570, Refs. p.569-570.

Evidence is presented that indicates that the primary environmental cue to antifreeze/cryoprotectant accumulation and increased ice nucleator activity is temperature-dependent in various insect species. In the freeze-tolerant, Nearctic carabid beetle *Pterostichus brevicornis,* first exposure to 0 deg results in the induction of glycerol synthesis independent of short daylength. In the freeze-tolerant larvae of the Antarctic midge *Belgica antarctica* antifreeze/cryoprotectant modulation is dependent in part on temperature and on dietary carbon source and independent of extremes in daylength. The relative advantages of temperature vs photic cues to winter hardening are discussed. (Auth.)

B-29958

Aarset, A.V., **Freezing tolerance in intertidal invertebrates (a review),** *Comparative biochemistry and physiology,* 1982 73A(4), p.571-580, Refs. p.578-580.

Freezing tolerance in intertidal invertebrates is reviewed. Among them figures the limpet *Patinigera polaris* from the antarctic region, which is found naturally frozen into intertidal scale ice. After release at high tide the limpets exhibit normal behavior. The cold resistance of the animals seems mainly to be based on tolerance to tissue ice formation. Freezing injury apparently occurs when a critical amount of water is frozen.

B-29959

DeVries, A.L., **Biological antifreeze agents in coldwater fishes,** *Comparative biochemistry and physiology,* 1982 73A(4), p.627-640, Refs. p.638-640.

Biological antifreezes are present in coldwater fishes and lower their freezing point below the freezing point of seawater, without substantially increasing the osmotic content of their body fluids. The antifreeze agents present in the Antarctic notothenioid and northern gadid fishes are glycopeptides composed of alanine, threonine, galactose and N-acetylgalactosamine. Although the average mol. wt of the antifreezes is between 5000 and 10,000, they have a very large effect on the freezing point of water which has been termed an antifreeze effect. The depression of the freezing point occurs via the noncolligative mechanism, adsorption-inhibition. Adsorption to ice prevents water from joining the ice lattice by increasing the radius of curvature of the fronts on the growth steps of the crystals thereby increasing their surface free energy. The antifreezes are a permanent feature of the Antarctic fishes. Antifreeze concentrations in the blood are between 3 and 4%, but they are not present in the urine. In the Antarctic and many northern species, the antifreezes are conserved in the circulation because the kidneys are aglomerular or functionally aglomerular. (Auth.)

B-29960

Green-Hammond, K.A., Ainley, D.G., Siniff, D.B., Urquhart, N.S., **Selection criteria and monitoring requirements for indirect indicators of changes in the availability of antarctic krill applied to some pinniped and seabird information,** *Marine Mammal Commission. Report,* Aug. 1983 MMC-82/03, 37p., PB83-263293, Refs. p.29-32.

The Scientific Committee of the Convention on the Conservation of Antarctic Marine Living Resources must determine how to detect and avoid significant changes in antarctic marine exosystems associated with krill harvesting. The detection of change is made difficult by sampling variation, variation among individuals in a population, natural environmental variation, and perturbations due to fishing. Species, populations, and population variables that can serve as indirect indicators of changes in krill availability should be selected on the basis of rapid, observable responses, feasibility of data collection, and ease of interpretation. Monitoring, or sampling schemes to collect data on indicators, should allow for large enough sample sizes to detect changes early. To help in assessing causes of any detected changes, data on environmental variables and harvesting should also be collected. (Auth.)

B-29968

Garrison, D.L., Ackley, S.F., Buck, K.R., **Physical mechanism for establishing algal populations in frazil ice,** *Nature,* MP-1717, Nov. 24, 1983 306(5941), p.363-365, 19 refs.

In polar regions ice algal communities are not only conspicuous but may also be important production sites and sources of seed populations for pelagic communities. Except for some studies near land-based stations, there are few long-term observations of ice algal populations, and few studies have considered how they form and develop. Until now, neither the mechanism for harvesting nor the effects on the composition of the ice community has been clearly demonstrated. In the Weddell Sea, we have sampled young sea ice discoloured by algae, and we present evidence that the algae were concentrated by a physical mechanism. We explain how such a process may accumulate planktonic forms in ice communities. (Auth. mod.)

B-29977

Cathey, D.D., Simmons, G.M., Jr., Parker, B.C., Yongue, W.H., Van Brunt, M.R., **Protozoan colonization of artificial substrates in two antarctic lakes,** *American Microscopical Society. Transactions,* Oct. 1982 101(4), p.353-367, 30 refs.

DLC QH201.A3

Protozoan colonization rates on artificial substrates in limnetic and benthic habitats were measured in two permanently ice-covered southern Victoria Land lakes. Lake Hoare and Lake Fryxell are located on opposite sides of, but share drainage from, the same piedmont glacier. Lake Fryxell has been shown to be the more eutrophic of the two lakes. The polyurethane foam (PF) substrates were initially colonized by autotrophic Sarcomastigophora which were succeeded by Ciliophora. Colonization data were fitted to the MacArthur-Wilson mode. Differences in equilibrium values and colonization rates between these antarctic lakes and temperate lakes can be explained by the smaller pool of protozoan taxa, lack of water turbulence within these permanently ice-covered high latitude lakes, and the constant cold temperature. Antarctic lakes, as aquatic habitats subjected to unusual stresses caused by the high latitudinal climate, provide valuable laboratories for the study of unifying ecological concepts. Moreover, the colonization study constitutes a valuable tool for further microfaunal investigations in antarctic lakes. (Auth.)

B-29978

Simmons, G.M., Wharton, R.A., Parker, B.C., Andersen, D., **Chlorophyll *a* and adenosine triphosphate levels in antarctic and temperate lake sediments,** *Microbial ecology,* 1983 9(2), p.123-135, 50 refs.

Analysis of adenosine triphosphate (ATP) from surficial sediment layers in two antarctic lakes and two temperate lakes showed a high degree of similarity in spite of differences between trophic state, mictic state, or geographic location. Adenosine triphosphate was found at all levels sampled in temperate lake sediment cores but occasionally was present only in surficial layers of antarctic cores. Surficial sediment layers from antarctic lakes contained high chlorophyll *a* (Chl*a*) levels due to the extensive benthic algal mats which occur there. In some antarctic cores, Chl*a* was detectable in deep, old mat layers, whereas Chl*a* was not found in any of the temperate lake cores. These data suggest that sediment microbial communities may be independent of environmental and biological properties of the overlying water masses. (Auth.)

B-29981

Piechura, J., **International protection of the living resources of the Antarctic** [Miedzynarodowa ochrona żywych zasobów morskich Antarktyki], *Technika i gospodarka morska,* Jan. 1981 31(1), p.23-24, In Polish.

DLC VK4.T4

Articles 1, 2, 4, 5, 7-22, 28 and 29 of the Antarctic Treaty, with emphasis on rules and regulations governing exploitation of antarctic living resources, are reviewed.

B-29982

Piechura, J., **Research at the Marine Fisheries Institute in Antarctica** [Badania Morskiego Instytutu Rybackiego w Antarktyce], *Technika i gospodarka morska,* July-Aug. 1981 31(7), p.374-376, In Polish.

DLC VK4.T4

Five Polish marine expeditions in the Antarctic, between 1975 and 1981, are described. Results of on-ship investigations in the areas of meteorology, oceanography, and on krill biology, stock and exploitation potential are reviewed.

B-30017

Gilbert, P.M., **Regional studies of daily, seasonal and size fraction variability in ammonium remineralization,** *Marine biology,* 1982 70(2), p.209-222, Refs. p.221-222

DLC QH91.A1M35

Rates of ammonium remineralization were determined using a N-15 isotope dilution technique for two oceanic regions, including the Scotia Sea, one coastal region, and one estuarine region, covering a wide range of ambient nutrient, light, and temperature conditions. Results showed that NH4 cation assimilative and regenerative fluxes were primarily in balance, even when the ambient nitrogenous pool was completely dominated by NO3 anions. Variations in uptake and remineralization rates relative to time of day and season were also determined. Size fraction studies at several of the sites showed that the smallest size fraction (<10 micron) was usually the most important in remineralizing NH4 cations, and the importance of the apparent bacterial fraction (<1 micron) may increase following blooms. (Auth.)

B-30019

McCosker, J.E., **Biology of well-dressed birds,** *Pacific discovery,* July-Sept. 1983 36(3), p.22-35.

Seventeen living species of penguins, two restricted to polar ice, are described. Most species favor somewhat warmer environments, and one species inhabits the equatorial Galapagos Islands. The obscure origin of penguins, as well as the derivation of their name, are discussed. The earliest penguin fossils, 70 to 100 million years old, suggest that penguins share a common ancestor with the living tube-nosed birds, which include the petrels, shearwaters, and albatrosses.

B-30028

Allen, M.W., Noffsinger, E.M., **Revision of the marine nematodes of the superfamily Draconematoidea Filipjev, 1918 (Nematoda: Draconematina),** *California. University. Publications in zoology,* Sep. 1978 Vol.109, 133p., 46 refs.

The superfamily Draconematoidea contains exclusively marine forms. The present revision is based upon the study of over 3,200 specimens obtained from samples collected at 90 locations from the major marine waters in the world. Draconematids appear to be most abundant at depths of less than 50 m, but some of the species have been recovered at depths of 540 m in antarctic waters. Most draconematids were found associated with various marine algae. Intraspecific and generic variations of the significant taxonomic characters and the development of the 4 larval stages in one genus were studied. This revision includes one new superfamily; one new family; 4 new subfamilies; 8 new genera; and 29 new species. (Auth. mod.)

B-30035

Watanabe, K., Nakajima, Y., Ino, Y., Sasaki, H., Fukuchi, M., **Plankton sampling on board the *Fuji* in 1980-1983,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.90, 11p., 1 ref.

During every austral summer season, plankton samplings on board the icebreaker *Fuji* have been carried out in the Indian sector of the Antarctic Ocean as part of the marine biological program of the JARE. Details of sampling method and the results of earlier works in 1972-1980 are published elsewhere. Since then, three expeditions, JARE-22, -23 and -24 (1980-1983), completed their plankton samplings. The data record of these results is presented in this report. A single Norpac standard net had been used in the earlier expeditions but a twin net was employed in JARE-23 and -24. The twin net consisted of two Norpac standard nets of two different mesh openings. Stations of plankton samplings in 1980-1983 are shown, data on the Norpac net hauls in JARE-22, -23 and -24 are listed, and data on the MTD net tows, the ORI-C net tows and the fish larva net tows in JARE-22 are summarized. (Auth.)

B-30039

Hochachka, P.W., Somero, G.N., **Biochemical adaptation,** Biochemical adaptation, Princeton, NJ, Princeton University Press, 1984, 537p.

DLC QP82.H63 1984

A small segment of this work (p.441-447) reviews recent discoveries of macromolecular antifreezes in antarctic fish. These antifreezes are described as examples of convergent evolution at the molecular level. The mechanisms of antifreeze action, *in vitro* and *in situ* functions of antifreezes, roles of antifreezes, and antifreeze synthesis and degradation are discussed.

B-30061

Decade of research on antarctic and subantarctic seals, *South African journal of science,* Jan. 1984 80(1), p.25-35, Refs. passim. For individual papers see B-30062 through B-30068.

An introduction to the international colloquium to mark ten years of research on antarctic and subantarctic seals by the Mammal Research Institute of Pretoria University, held on Sept. 6, 1983, is presented by R.M. Laws of the British Antarctic Survey. This presentation is followed by seven individual reports and their discussion.

B-30062

Condy, P.R., **Population of the southern elephant seal, *Mirounga leonina,* at Marion Island, 1973-1983,** *South African journal of science,* Jan. 1984 80(1), p.26-27, 8 refs.

One of the most significant findings reported from the research on elephant seals at Marion Island is that their population is declining, and that these declines seem widespread across the whole southern Indian Ocean. Some common factors are suggested which could be affecting these populations, namely insufficient number of harem bulls, the killer whale effect, and competition with the rapidly recovering stocks of subantarctic fur seals.

B-30063

Bester, M.N., **Status of the populations of the fur seals *Arctocephalus tropicalis* and *Arctocephalus gazella* north of the Antarctic Convergence,** *South African journal of science,* Jan. 1984 80(1), p.27-28, 17 refs.

The geographic distribution of the subantarctic *Arctocephalus tropicalis* and the antarctic fur seal *A. gazella,* and their population distribution patterns, are described. The competition between species for a common food source, and their consequences, are discussed.

B-30064

Kerley, G.I.H., **Relationships between sympatric breeding populations of fur seals *Arctocephalus* sp. at Prince Edward Islands,** *South African journal of science,* Jan. 1984 80(1), p.28-29, 9 refs.

The breeding habits of *Arctocephalus gazella* and *A. tropicalis* fur seals are compared. It is concluded that, although there is some difference in breeding habitat preferences, this is not sufficient to prevent hybridization as breeding localities of both species overlap. The hybrid population was estimated to represent approximately 0.1% of the fur seals at Prince Edward Islands

B-30065

Panagis, K., **Influence of southern elephant seals, *Mirounga leonina,* on the coastal moulting areas at Marion Island,** *South African journal of science,* Jan. 1984 80(1), p.30, 11 refs.

Two plant community complexes and six associations, resulting from activity at the moulting sites of southern elephant seals, are described. Chemical analyses of the soil show an increase in concentrations of all the mineral nutrients in the molt areas. The biomass figures for the mesofauna of the two study sites are 5.3 g/sq m and 3.90 g/sq m, respectively, significantly lower than those given by other authors.

B-30066

Skinner, J.D., **Research on the Ross seal, *Ommatophoca rossii,* in the King Haakon VII Sea, Antarctica,** *South African journal of science,* Jan. 1984 80(1), p.30-31, 13 refs.

Preliminary results of a study of Ross seals, covering primarily aspects of the species' life cycle, are discussed and tabulated.

B-30067

Van Aarde, R.J., **Aspects of the population biology of the southern elephant seal, *Mirounga leonina,* at Kerguelen Islands,** *South African journal of science,* Jan. 1984 80(1), p.31-32, 13 refs.

It is pointed out that at least three of the sub-populations of the southern elephant seal have, since 1970, been decreasing at rates varying from 4.6% to 8.0% per year. Literature is reviewed, and future research recommended, on the relationship between the seal population density and breeding habit, behavior, and other factors which may vary with density.

B-30068

Bester, M.N., Jouventin, P., **Rationale and strategy for a collaborative research program between SASCAR and TAAF on pinnipeds inhabiting South Indian Ocean Islands (the Kerguelen province),** *South African journal of science,* Jan. 1984 80(1), p.32-34, 47 refs.

Terrestrial and marine approaches to a joint research program between South Africa and France on Indian Ocean seals are outlined. The results of the project to date, indicating a drastic decrease in the seal population, are summarized. A pinniped bibliography of 47 entries, including publications up to Sept. 1983, is presented.

B-30070

Gardner, B.D., **Chlorinated pesticides in cats on Marion Island,** *South African journal of science,* Jan. 1984 80(1), p.43-44, 11 refs.

Data on pesticide translocation in the marine environment in the Indian Ocean are presented. Unexpectedly high chlorinated pesticide residue levels in the fat and liver of feral cats on Marion Island are shown. Lower levels were found in seals and dolphins off the west coast of South Africa, although the diet of these mammals resembles that of the birds on which the Marion Island cats feed.

B-30072

Zinsmeister, W.J., Feldmann, R.M., **Cenozoic high latitude heterochroneity of Southern Hemisphere marine faunas,** *Science,* 20 Apr. 1984 224(4646), p.281-283, 27 notes and refs.

Discovery of 11 genera, in five classes within the Mollusca, Echinodermata, and Arthropoda in upper Eocene rocks on Seymour Island, Antarctica, previously known only from Late Cenozoic in midlatitudes, suggests that the high latitude region of the Southern Hemisphere acted as a center of origin and dispersal for a broad spectrum of taxa. Precursors to modern deep- and shallow-water midlatitude forms evolved and flourished in the high latitudes until conditions in lower latitudes favored their dispersal. These observations of Antarctic marine invertebrates corroborate those recently made about terrestrial mammals and plants in the Arctic. (Auth.)

B-30073

Bykowski, P., **Methods for technological development of meal production from antarctic krill** [Kierunki i możliwości rozwoju technologii wytwarzania maczek z kryla antarktycznego], *Technika i gospodarka morska,* May 1982 32(1), p.25-26, In Polish.

DLC VK4.T4

Mass production of krill meal is discussed and technical and other problems, such as krill's high fluoride content, are pointed out. The chemical composition of krill meal, from krill meat and carapace, and that of fish meal is tabulated and comparative studies of the different sources of meal are reviewed.

B-30074

Bykowski, P., **Industrial exploitation of antarctic krill** [Niektóre problemy zwiazane z eksploatacja przemyslowa kryla antarktycznego], *Technika i gospodarka morska,* July 1982 32(3), p.133-134, In Polish.

DLC VK4.T4

Basic problems related to krill exploitation on a large scale, such as stock accessibility, high fluoride content in krill, etc., and research programs designed to resolve these difficulties, are reviewed. Polish research activities began with the modernization of Soviet technology in the production of a new food item, a krill concentrate called "Pasta Okean". The aim of Polish investigators is to sufficiently refine the krill product to make it an acceptable shrimp substitute in terms of taste and nutritive value.

B-30075

Kalinowski, J., **Krill stock research in the BIOMASS program** [Badania zasobów kryla w ramach programu BIOMASS], *Technika i gospodarka morska,* July 1982 32(3), p.135-136, In Polish.

DLC VK4.T4

A list of committees under the BIOMASS program is given, and their activities concerning the southern ocean ecosystems and their living resources—particularly krill—are reviewed. The names of countries participating in the FIBEX experiment, and the research carried out by each in different areas of the Antarctic, are also presented.

B-30076

Quetin, L.B., Ross, R.M., **Depth distribution of developing *Euphausia superba* embryos, predicted from sinking rates,** *Marine biology,* 1984 79(1), p.47-53, 23 refs.

Sinking rates of the embryos of *Euphausia superba* were measured during development in the laboratory at Palmer Station, Antarctic Peninsula, during austral summer 1982. Two densities of seawater were used in these experiments; the lower density (1.027 g/cu cm) is characteristic of the upper 300 m of the water column, the higher (1.029 g/cu cm) is characteristic of the deeper "circumpolar deep water". During development, the eggs sank at an initial average rate of 175 m/d, declining to 51 m/d during the gastrula to early limb bud stages and increasing before hatching to near initial rates. The larvae hatched within 6 d. It is estimated that the majority of the embryos of *E. superba* should hatch at a depth of about 850 m. (Auth.)

B-30077

Thiriot-Quiévreux, C., **Karyotype of *Aulacomya ater regia* (Mollusca: Bivalvia: Mytilidae) from the Kerguelen Islands** [Le caryotype d'Aulacomya ater regia (Mollusca: Bivalvia: Mytilidae) des Iles Kerguelen], *Marine biology,* 1984 79(1), p.89-91, In French with English summary. 16 refs.

In 1983, specimens of the antarctic mussel *Aulacomya ater regia* Powell, 1957 were collected from the Kerguelen Islands and transported alive to the Zoological Station in Villefranche-sur-Mer, France. The chromosome complement of the mussel, as determined from branchial tissue, was found to consist of 13 pairs of chromosomes with terminal or subterminal centromeres. This species differs from the other species of Mytilidae studied up to the present in the number and the morphology of the chromosomes. *A. ater regia* is also unique among the known bivalves in displaying only terminal or subterminal centromeres. (Auth.)

B-30078

Kaylor, J.D., Learson, R.J., **Krill and its utilization: a review,** *U.S. National Oceanic and Atmospheric Administration. NOAA technical report,* July 1983 No.769, 10p., 24 refs.

This article is based on a review of the literature on 1) the antarctic krill resource, 2) multinational efforts to use krill as food, and 3) technological, economic, and marketing aspects of krill. Finding the potential value of krill requires an appraisal of 1) feasibility of producing krill products with a reasonable degree of marketing acceptability, 2) the value of our lending technical assistance to some nation to achieve the above, and 3) the economic and international pressures that are likely to favor those nations that are already completely subsidized and have vertical integration of their fisheries. It is widely believed that abundant, protein-rich krill could contribute substantially to the world protein food supplies. Owing to the lack of development of a krill product possessing wide appeal and the unknown economic return of this potential fishery, eventual success seems dependent on government-subsidized operations. (Auth. mod.)

B-30090

Dartnall, H.J.G., **Rotifers of the Antarctic and Subantarctic,** *Hydrobiologia,* 1983 Vol.104, p.57-60, 20 refs. Also reprinted as Biology of rotifers. Proceedings of the Third International Rotifer Symposium held at Uppsala, Sweden, August 30- September 4, 1982. Edited by B. Pejler, R. Starkweather and Th. Nogrady. Developments in hydrobiology, No.14.

More than seventy species of rotifers are identified from some twenty collections obtained in Antarctica and some off-lying islands. An assessment is made of the distribution of rotifers in the Antarctic and Subantarctic.

B-30092

Bernstein, N.P., Maxson, S.J., **Sexually distinct daily activity patterns of Blue-eyed Shags in Antarctica,** *Condor,* May 1984 86(2), p.151-156, 36 refs.

Sexually distinct rhythms of nest attendance were documented for Blue-eyed Shags *(Phalacrocorax atriceps)* in Antarctica. Males attended the nest from approximately 00:00-12:00 and foraged approximately from 12:00-24:00. Female activity patterns were the opposite. Timing of male courtship occurred around 12:00 during the prelaying and laying-incubation periods, and timing of chick feeding was also sexually distinct. Males fed chicks in the early morning and late evening while females fed chicks in the afternoon. The rhythms were colony-wide and, at least, partially influenced by times of sunrise and sunset. Although specific adaptive pressures influencing these patterns are unknown, intersexual foraging competition is presented as a possible explanation relative to other theories. (Auth.)

B-30093

Brown, C.R., Adams, N.J., **Basal metabolic rate and energy expenditure during incubation in the wandering albatross *(Diomedea exulans)*,** *Condor,* May 1984 86(2), p.182-186, 22 refs.

Metabolic rates of incubating and non-incubating adult Wandering Albatrosses *(Diomedea exulans)* were measured using the birds' rate of oxygen consumption. Basal metabolic rate (BMR) was 1,755 kJ/day for birds of mean mass 8,130 g. This is close to the BMR predicted for non-passerines of equivalent mass from allometric equations. Incubating female Wandering Albatrosses of mean mass 7,930 g expended 2,415 kJ/day. This is 1.4 times BMR, and is also higher than previous estimates for incubating Wandering Albatrosses based on their rates of mass loss. These differences may be due in part to stresses imposed on the incubating birds during measurement of oxygen consumption, or to errors in estimating the amount of fat that the birds oxidized during their incubation fast, in studies where their energy expenditure was calculated from loss of mass. (Auth.)

B-30094

Parker, B.C., Simmons, G.M., Jr., Seaburg, K.G., Cathey, D.D., Allnutt, F.C.T., **Comparative ecology of plankton communities in seven antarctic oasis lakes,** *Journal of plankton research,* 1982 4(2), p.271-286, Refs. p.284-286.

Similarities and differences in the biological limnology of several perennially ice-covered, amictic lakes within a 100 x 100 km grid of an antarctic desert oasis have been identified. Most of the lakes possessed the cryptophyte *Chroomonas lacustris* as the dominant phytoplankter which was accompanied by other algae, bacteria, yeasts, and ciliates. Maximum phytoplankton densities and extractable particulate chlorophyll *a* usually occurred well below the poorly transparent ice covers. The seven lakes varied among themselves but all displayed more oligotrophic than eutrophic values for five trophic state indicators. The high dissolved O2/CO2 ratio in these lakes caused by supersaturated oxygen and the previously reported high proportion of extracellular photosynthate production by the phytoplankton raise the possibility of a significant amount of photorespiration compared to inorganic carbon incorporation for growth. In addition to the supersaturated oxygen, the plankton communities could be limited by low light intensities, hypersalinity (in some lakes), available nutrients, and grazing by protozooplankton. (Auth.)

B-30096

Hewes, C.D., Maxwell, J.G.H., **Nutrient cycles and food chains in the Antarctic,** *South African journal of science,* Apr. 1984 80(4), p.153-154.

Studies of the productivity in the southern ocean and of the antarctic terrestrial ecosystem, as presented at the Fourth International SCAR Symposium held in South Africa in September 1983, are reviewed. In contrast to reports presented at the previous symposium held 10 years earlier, new research holds that the antarctic ecosystem does not embrace a simple linear food chain, but rather a complex food web, with all organisms interacting with one another, and that the importance of krill to many predatory pelagic species may vary with the seasons.

B-30106

Mamaeva, N.V., **Study of antarctic infusoria** [K izucheniiu infuzoriĭ Antarktiki], *Akademiia nauk SSSR. Doklady,* Mar.-Apr. 1984 275(1), p.250-251, In Russian. 7 refs.

Great numbers of infusoria in the vicinity of several antarctic stations are reported. The average biomass per sq m in the layer from 0 to 150 m is 1 to 2 g, with maximum values of 8.5 and 14.1 g. The maximum amount of individuals per sq m was 23 million, with a mass of 400 mg. Very little infusoria is found in the Antarctic Circumpolar Current, and only near the water surface. A map of stations where research was carried out is included.

B-30109

Subramanian, B.R., Tanabe, S., Hidaka, H., Tatsukawa, R., **DDTs and PCB isomers and congeners in antarctic fish,** *Archives of environmental contamination and toxicology,* Nov. 1983 12(6), p.621-626, 25 refs.

Polychlorinated biphenyls (PCBs) and DDTs were quantitated in four species of antarctic fish collected around the Japanese Antarctic Research Station during January to december 1981. PCBs ranged between 0.08 and 0.77 ng/g and DDTs from 0.3 to 1.9 ng/g, wet weight basis in whole body homogenates. In *Pagothenia borchgrevinki,* the largest sample (N = 21), both classes of chlorinated hydrocarbons increased linearly with body weight. Analysis of PCB isomers and congeners by mass fragmentography showed greater retention of the more highly chlorinated biphenyls in larger specimens. The bottom dwelling *Trematomus bernacchii* and *T. hansoni* revealed greater concentrations of highly chlorinated biphenyls than the surface dwelling *P. borchgrevinki.* In general, the concentrations of PCBs and DDTs in antarctic fish were very low compared to other open ocean water fish reported in the literature; this agreed with atmospheric and hydrospheric concentrations of PCBs and DDTs in antarctic regions where low levels were reported. (Auth.)

B-30110

Picken, G.B., Allan, D., **Unique spawning behaviour by the antarctic limpet *Nacella (Patinigera) concinna* (Strebel, 1908),** *Journal of experimental marine biology and ecology,* Sept. 1983 71(3), p.283-287, 15 refs.

The antarctic limpet *N. (Patinigera) concinna* (Strebel, 1908) forms temporary stacks before spawning, a behavior which ensures that gametes are released in close proximity. This promotes the fertilization of a large proportion of eggs, so reducing the energy outlay necessary to ensure reproductive success. The annual reproductive output of *Nacella* is low in comparison with other Patellidae. Rapid fertilization may also help to contain larvae in shallow coastal waters suitable for settlement. Evidence of this unique spawning behavior has now been obtained in a series of photographs taken at Signy Island, South Orkney Islands. (Auth.)

B-30111

Śmialowska, E., Kilarski, W., **Fine structure of endothelial cells of white-blooded fish *Chaenocephalus aceratus*,** *Zeitschrift für mikroskopisch-anatomische Forschung,* 1983 97(6), p.967-978, Refs. p.976-978.

The fine structure of the arterial endothelial cells from an eye moving muscle in an antarctic teleostean fish, *C. aceratus,* is described. Thin filaments of 4.6 nm in diameter occur in form of compact bundles situated just beneath the cell membranes, whereas the 9 nm thick filaments appear in the central part of the cell extensions. Both types of filaments, as well as the numerous microtubules (25 nm) are oriented along the axis of the artery. A large number of rounded, tubular bodies is localized mostly in the cell protrusions close to the cell membrane. The role of the substances produced by these Weibel Palade bodies is discussed, as well as that of the well developed filament system, in the regulation of blood pressure in vessels of antarctic fish. (Auth.)

B-30115

Clarke, A., **Lipid content and composition of some antarctic macrozooplankton,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.57-70, Refs. p.68-70.

The lipid content and composition of 24 species of macrozooplankton from seven phyla, collected mainly from the southern ocean around South Georgia, are reported. Some groups, notably cnidarians, ctenophores, chaetognaths, annelids and salps contained only small amounts of lipid (0.05-34.4% fresh weight) and the storage lipid was usually triacylglycerol. An exception was a ctenophore tentatively identified as *Pleurobrachia* sp., which contained a small wax ester droplet close to the gut. Crustaceans usually contained moderate or large amounts of lipid (1.3-19.4% fresh weight) of which a significant proportion was often wax ester, especially in copepods and some euphausiids. There was a significant positive correlation between total lipid content and the proportion of wax ester in the lipid. Freshwater zooplankton from Heywood Lake on Signy Island, South Orkneys, differed from marine species in storing triacylglycerol rather than wax ester, despite a strong seasonal variation in food availability. (Auth.)

B-30116

Bell, B.G., **Synoptic flora of South Georgian mosses: *Grimmia* and *Schistidium*,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.71-109, Refs. p.102-103.

The species from South Georgia belonging to the genera *Grimmia* and *Schistidium* are described, a combined key for both genera, and short historical notes on the taxonomy of all species, being provided. Habitat and distribution data for all species together with full lists of all specimens examined are also given *S. falcatum* (Hook. f. et Wils.) B. Bremer, *S. rivulare* (Brid.) Podp., and *Grimmia incrassicapsulis* B.G. Bell, a new species based on a hom. illeg., *G. inaequalis* Dix. et Sainsb., described from New Zealand, are reported for the first time from the island. *Grimmia hyalino-cuspidata* C. Muell., *G. syntrichiacea* C. Muell., *G. urnulacea* C. Muell. and *G. celata* Card. are transferred to *Schistidium. Grimmia nordenskjoldii* Card. and *G. kerguelensis* Card. are reduced to synonymy with *G. immersoleucophaea* (C. Muell.) Kindb. and *G. asperitricha* Dix. et Sainsb., a New Zealand species, is reduced to synonymy with *G. grisea* Card. (Auth.)

B-30117

Booth, R.G., **New species of mite in the genus *Nanorchestes* (Acari, Prostigmata) from Signy Island, South Orkney Islands,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.111-116, 9 refs.

Nanorchestes triclavatus n. sp. (Nanorchestidae) is described from Signy Island, South Orkney Islands. This species was extracted from fine sand and gravel, collected from a fellfield habitat. It is readily distinguished from all other Antarctic species *Nanorchestes* by the clubbed sensilla. A key to the species of *Nanorchestes* occurring in the Antarctic is included. (Auth.)

B-30118

Croxall, J.P., Pilcher, M.N., **Characteristics of krill *Euphausia superba* eaten by antarctic fur seals *Arctocephalus gazella* at South Georgia,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.117-125, 19 refs.

Samples of krill taken from lactating female fur seals in six seasons at Bird Island, South Georgia showed that they almost exclusively ate mature krill of 40-60 mm length, including gravid females. In each of four samples from Jan-Feb 1983, female krill outnumbered males by four to one. Extensive krill samples from net-hauls around South Georgia contained very few mature krill; only 1% were longer than 50 mm, compared with 75% in fur seal samples. Net avoidance by large krill and biases in vertical sampling by nets and predators are discounted and it is suggested that breeding fur seals are exploiting, especially within 100 km of north-west South Georgia, rich local resources of mature krill which are so far unsampled by net hauls. (Auth.)

B-30119

Hector, J.A.L., **Techniques for serial collection of blood samples and inspection of gonads in free-living albatrosses,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.127-133, 8 refs.

Methods for obtaining serial blood samples (daily and three-hourly) and for examining and measuring reproductive organs in free-living albatrosses are described. Simple cannulation techniques were highly efficient and over 800 plasma samples were obtained in a single season with very little disruption of breeding activity. The use of Ketamine and Saffan as anaesthetics is evaluated, the former being easier to administer, the latter giving quicker and better recovery. Laparoscopy techniques for gonad examination are described; only 10% of 160 birds treated did not immediately resume normal breeding activities and all were seen later in the season. (Auth.)

B-30121

Lindeboom, H.J., **Nitrogen pathway in a penguin rookery,** *Ecology,* Feb. 1984 65(1), p.269-277, 36 refs.

The most important N sources for the Marion Island ecosystem are the excreta of birds that forage at sea. Of the N excreted by penguins during their molt fast, 80% appeared to be uric acid, with the remaining 20% mainly proteins and NH3. The uric acid is rapidly degraded by aerobic and anaerobic microorganisms, and no uric acid could be detected in the penguin rookery deposit. Models of N cycle in both a macaroni penguin and a king penguin rookery during the molt fast and breeding season are given. In both rookeries the degradation of uric acid into NH3 and the subsequent evaporation are, quantitatively, the most important processes. The NH3 production in the rookeries of Macaroni penguins as well as the heavy rains and the predominantly westerly winds have produced an NH3 shadow around the rookery where a vigorous plant growth occurs. The vegetation has formed a thick peat layer around the penguin rookery. 14C dating of this peat layer showed that the Macaroni penguins first bred on Marion Island about 7000 yr ago. (Auth.)

B-30122

Fiala, M., Oriol, L., **Vitamin B12 and phytoplankton in the antarctic ocean. Distribution and experimental approach** [Vitamine B12 et phytoplancton dans l'Océan Antarctique. Distribution et approche expérimentale], *Marine biology,* 1984 79(3), p.325-332, In French with English summary. Refs. p.331-332.

In late summer antarctic waters of the southern part of the Indian Ocean contain low amounts of dissolved Vitamin B12: 1 ng/l on average. However, higher concentrations were recorded in two areas: in the subantarctic convergence zone and between 50 and 57 S, with values greater than 3.5 ng/l. Despite nutrient-rich waters, primary production was low and the phytoplankton sparse. Abundance of diatoms was related, to a certain extent, to the concentration of Vitamin B12. An experimental approach was applied to (1) artificially enriched natural sea water, and (2) cultures of two diatom species isolated from antarctic waters, *Nitzschia turgiduloides* and *Chaetoceros* sp. The experiments demonstrated that antarctic diatoms in general do not require any of the three investigated vitamins for growth. However, Vitamin B12 has a slightly stimulating effect on growth. This may explain the observed relation between phytoplankton density and vitamin concentration in the antarctic ocean. This experimental approach elucidates the minor role of vitamins in the primary production of antarctic waters and provides indirect evidence of the major importance of turbulence as a limiting factor. (Auth.)

B-30123

Sasaki, H., Watanabe, K., **Underwater observations of ice algae in Lützow-Holm Bay, Antarctica,** *Antarctic record,* March 1984 No.81, p.1-8, In english with Japanese summary. 9 refs.

Heterogeneity in the horizontal distribution of standing stock of ice algae was observed in January, 1983, in a fast ice area of Lützow-Holm Bay, Antarctica. Colonies of ice algae easily came off from the undersurface of sea ice due to the mechanical disturbances from the ice corer and from water movements caused by a diver. The bottom layer of sea ice and the substratum of ice algae were also susceptible to disturbances. The accuracy in the estimation of standing stock of ice algae is discussed. (Auth.)

B-30126

Ino, Y., Fukuchi, M., **Report on chlorophyll *a* distribution along the course of the *Fuji* in 1981-1982,** *Antarctic record,* March 1984 No.81, p.38-44, In English with Japanese summary.

Data on chlorophyll *a* concentrations measured on board the *Fuji* as part of the marine biological programme of the 23rd Japanese Antarctic Research expedition in 1981-1982 are presented. An extensive table, showing the station number, date, time, latitude, longitude, chlorophyll *a* concentration and water temperature, is included.

B-30131

Warwick, R.M., **Species size distributions in marine benthic communities,** *Oecologia,* 1984 61(1), p.32-41, 45 refs.

Observations of species body size distributions from 8 temperate benthic communities are described. Brief discussion of some implications of these observations includes speculations on the larval ecology of macrofauna, on gigantism in Antarctic invertebrates, and on the benthic Sheldon spectrum. (Auth. mod.)

B-30141

Akiyama, T., Murai, T., Hirasawa, Y., Nose, T., **Supplementation of various meals to fish meal diet for chum salmon fry,** *Aquaculture,* March 15, 1984 37(3), p.217-222, 20 refs.

In a 6-wk feeding experiment, chum salmon, *O. keta,* swim-up fry, were fed fish meal diets supplemented with silkworm pupae powder (5%), dried beef liver (5%), krill meal (5%) or earthworm powder (5%) at the expense of fish meal, or substituting glucose (13%) for dextrin. The growth rate and feed efficiency of the krill meal group were significantly better than those of the control group (without supplement or substitution). No significant differences were noted in body protein and ash contents among all dietary treatments. (Auth.)

B-30142

Gru, D., Cousseau, M.B., **Age and growth of *Sprattus fuegensis* off Santa Cruz Province and Falkland Islands** [Estudio de edad y crecimiento de la sardina fueguina *(Sprattus fuegensis)* de las costas de la provincia de Santa Cruz e Islas Malvinas], *Revista de investigación y desarrollo pesquero,* Nov. 1982 No.3, p.51-58, In Spanish with English summary. 5 refs.

Samples of *Sprattus fuegensis* collected in coastal waters of the Santa Cruz Province, Argentina, and the Falkland Islands in 1974 and 1978 were analyzed for age frequency distribution, length and weight for each region and each year. On the basis of marked differences in growth parameters the conclusion is reached that the sardines of the two regions constitute two different populations.

B-30143

Cousseau, M.B., **Taxonomic revision and morphometric and meristic analysis of *Sprattus fuegensis* (Jenyns, 1842)** [Revisión taxonómica y análisis de los caracteres morfométricos y merísticos de la sardina fueguina *Sprattus fuegensis* (Jenyns, 1842) (Pisces *Clupeidae)*], *Revista de investigación y desarrollo pesquero,* Nov. 1982 No.3, p.77-94, In Spanish with English summary. Refs. p.93-94.

A study was made of 484 specimens of *Sprattus fueguensis* collected off three different districts of Santa Cruz Province, Argentina, and the northern coastal region of the Falkland Islands. Neither morphometric nor meristic characters showed differences between sexes. The relationship between morphometric characters and standard length was found to be linear. All sizes fitted to only one straight line with the exception of the pre-pectoral distance. Meristics indicated no differences among the four areas, but comparison of morphometry between coastal continental sardines and those off the Falkland Islands showed statistically significant differences in the pectoral fin length and the pre-anal distance. (Auth. mod.)

B-30148

Seppelt, R.D., **Bryoflora of the Vesfold Hills and Ingrid Christensen Coast, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* May 1984 No.20, 31p., Refs. p.26-31.

The bryoflora of the Vestfold Hills and Ingrid Christensen Coast includes six moss species and one hepatic. Moss species represented in the flora are *Grimmia antarctici, Grimmia lawiana, Ceratodon purpureus, Sarconeurum glaciale, Bryum algens, Bryum argenteum.* The one hepatic *Cephaloziella exiliflora,* from the Larsemann Hills, represents the most southerly record of an hepatic. A discussion of the antarctic distribution and taxonomic problems associated with the recognition of individual species is included. All species are illustrated. (Auth.)

B-30154

Copson, G.R., **Annotated atlas of the vascular flora of Macquarie Island,** *Australian National Antarctic Research Expeditions. ANARE research notes,* May 1984 No.18, 71p., 27 refs.

The atlas shows the known distribution and abundance of each vascular species on Macquarie Island immediately prior to the commencement of control measures against rabbits in 1978. It gives a baseline against which changes in the vegetation can be monitored. The effects of the introduced vertebrates on the vegetation are discussed. Additional data are given on the habitat, gregarious performance and phenology of some species. (Auth.)

B-30155

Gubsch, G., **On the distribution and biology of ice fish (Chaenichthyidae) in the Atlantic sector of Antarctica** [Zur Verbreitung und zur Biologie der Eisfische (Chaenichthyidae) im atlantischen Sektor der Antarktis], *Fischerei-Forschung,* 1982 20(2), p.39-47, In German. 25 refs.

The research on 10 ice fish reported here includes the vertical and horizontal distribution, growth, maturation, and nutrition of each species. Details of morphological differences, populations, geographic distribution and feeding habits are given.

B-30156

Hoffmann, U., **Age determination and growth of *Notothenia gibberifrons* Lönnberg at South Georgia** [Zur Altersbestimmung und zum Wachstum von *Notothenia gibberifrons* Lönnberg bei South Georgia], *Fischerei-Forschung,* 1982 20(2), p.49-53, In German. 9 refs.

Details and results of the measurements are given and comparisons between two age groups are made on the basis of sex.

B-30161

Wharton, R.A., Jr., Parker, B.C., Simmons, G.M., Jr., **Distribution, species composition and morphology of algal mats in antarctic dry valley lakes,** *Phycologia,* Dec. 1983 22(4), p.355-365, Refs. p.364-365.

Algal mats comprised primarily of the blue-green algae (cyanobacteria) *Phormidium frigidum* and *Lyngbya martensiana,* several species of pennate diatoms and heterotrophic bacteria occur abundantly throughout much of the benthic regions of perennially ice-covered Lakes Bonney, Chad, Fryxell, Hoare, and Vanda, southern Victoria Land. The particular types of mats described include moat and pond mats, ice cover mats, *in situ* lift-off, pinnacle, aerobic prostrate and anaerobic prostrate mats. Variations in light, temperature, conductivity and oxygen between the five lakes and their *in situ* habitats explain many of the differences in algal species composition and mat morphology. A unique feature of many of the benthic mats is their development into modern cold freshwater stromatolites currently known nowhere else on earth. (Auth.)

B-30162

Davey, A., Marchant, H.J., **Seasonal variation in nitrogen fixation by *Nostoc commune* Vaucher at the Vestfold Hills, Antarctica,** *Phycologia,* Dec. 1983 22(4), p.377-385, Refs. p.384-385.

Studies of *in situ* nitrogen fixation by the blue-green alga *Nostoc,* measured by acetylene reduction, were conducted over a 12 month period at the ice-free Vestfold Hills. Substantial nitrogenase activity occurred during the austral summer, but ceased when vegetation surface temperatures fell below -7 C. Free-living foliose mats of *N. commune* Vaucher, submerged during times of snowmelt, reduced acetylene during summer. Damp moss-*Nostoc* associations growing low on west-facing, leeward slopes were more active during this period, reducing acetylene, whilst the partially desiccated moss-*Nostoc* cushions at the tip of these slopes exhibited the lowest activity. The rates of acetylene reduction by *Nostoc* are determined by temperature and availability of water. (Auth.)

B-30163

Williams, J.B., Ricklefs, R.E., **Egg temperature and embryo metabolism in some high-latitude procellariiform birds,** *Physiological zoology,* Feb. 1984 57(1), p.118-127, 33 refs.

Incubation temperatures of eggs of Leach's storm petrel, Wilson's storm petrel and the southern giant fulmar averaged 35.9 deg, 35.7 deg and 35.5 deg C, respectively. These are well within the range of temperatures for other species of birds and indicate that the prolonged incubation periods of petrels are not attributable to low incubation temperatures. The depressing effect was measured of cooling (Q10) on rate of heartbeat of small embryos and rate of O2 consumption of larger embryos. Values of Q10 increased at lower temperatures but in most cases did not differ from, or in some cases even exceeded, the values for embryos of species that lack cooling tolerance. Large embryos of the giant fulmar, which has slow embryonic development but continuous incubation, did not survive prolonged cooling, indicating that not all slowly developing embryos tolerate protracted cooling, at least in their late stages of development. Rates of O2 consumption by storm petrel embryos were about 2/3 the level of the similar-sized but rapidly growing Japanese quail embryo. Giant fulmar embryos exhibited low rates of O2 consumption, as do other Procellariiformes, but, surprisingly, so did the rapidly growing skua embryos. (Auth.)

B-30164

Adams, N.J., Brown, C.R., **Metabolic rates of subantarctic procellariiformes: a comparative study,** *Comparative biochemistry and physiology,* 1984 77A(1), p.169-173, 18 refs.

The relationship between metabolic rate and body mass for 10 sp. of subantarctic procellariiformes is described by the equation: M = 382.2W exp 0.68. The relationship between metabolic rate and body mass for 10 sp. of subantarctic, 2 sp. of subarctic and 3 sp. of tropical and subtropical procellariiformes is described by the equation: M = 373.6W exp 0.66. The relationships are comparable to those derived for other groups of non-passerine birds. (Auth.)

B-30165

Burn, A.J., **Energy partitioning in the antarctic collembolan *Cryptopygus antarcticus,*** *Ecological entomology,* Feb. 1984 9(1), p.11-21, 25 refs.

Consumption, production and assimilation rates were determined for two age groups of *C. antarcticus* to give an estimate of energy utilization, and to investigate low temperature adaptation in its energy partitioning. Feeding selectivity shown in laboratory preference tests was supported by gut analysis of field animals from contrasting sites. Although moulting rate was not significantly affected by food type, rates of growth were slowest and mortality highest when fed on a none-preferred substrate. Both a radiolabeling and a more direct method for measuring dry weight consumed gave similar results for *Cryptopygus* feeding on algae. The consumption rate for animals when feeding on algae was lower than that on moss peat. The assimilation efficiency for immature animals feeding on algae was 46% and for mature animals 19%; the values when feeding on moss peat were 7% and 10%, respectively. The net production efficiency ranged from 35% (immatures) to 13% (matures) and was similar on both substrates. (Auth.)

B-30166

Miller, D.G.M., **Results of a combined hydroacoustic and midwater trawling survey of the Prince Edward Island group,** *South African journal of antarctic research,* 1982 Vol.12, p.3-10, With Afrikaans summary. 38 refs.

A combined hydroacoustic and midwater trawling survey of the Prince Edward Islands was completed in May-June 1980. The area was characterized by relatively low zooplankton abundance and biomass (0.001-2.625 mg dry weight/cu m), thought to be the result of seasonal variation. Dominant species found were *Parathemisto gaudichaudii, Sagitta gazellae* and *Gaimardia trapesina.* Both *P. gaudichaudii* and *S. gazellae* along with *Euphausia vallentini* were implicated in the diets of island-based predators in the region. (Auth.)

B-30167

Bester, M.N., Lenglart, P.Y., **Analysis of the southern elephant seal *Mirounga leonina* breeding population at Kerguelen,** *South African journal of antarctic research,* 1982 Vol.12, p.11-16, With Afrikaans summary. 21 refs.

The spring 1979 breeding population of southern elephant seals at Kerguelen numbered 2,993 bulls and 38,181 cows, with 36,291 live pups present during the census period. Significant differences in the overall sex ratio, harem structure and frequency distribution exist in comparison with previous surveys. These differences may be related to the difference in the mean census dates of the different years, but were also accompanied by a continued decrease in both the cow and bull components, corroborating the slump noted since 1970. An analysis based on subdivisions of the study area into distinct regions showed area specific increases and decreases in cow numbers, in spite of the net decrease in cow numbers. The linear regression of area specific percentage pup mortality on the density of cows was highly significant, which could explain the area specific fluctuation in cow numbers, elephant seal cows reputedly showing fidelity to their birthsites. (Auth.)

B-30168

Miller, D.G.M., **Results of a combined hydroacoustic and midwater trawling survey of the Gough Island region,** *South African journal of antarctic research,* 1982 Vol.12, p.17-22, With Afrikaans summary. 29 refs.

A combined hydroacoustic and midwater trawling survey of the Gough Island region was completed in October-November 1980. The area was chracterized by low zooplankton abundance and biomass (0.001-2.90 mg dry weight/cu m), probably as a result of low primary production. The majority of faunal types collected were of sub-Antarctic origin but differed significantly from species collected in the Prince Edward Island region. The most common species were *Parathemisto gaudichaudii, Dimophyes arctica, Eukronia hamata* and an unidentified euphausiid larva. A possible relationship between increased zooplankton abundance and an island-eddy effect was indicated. (Auth.)

B-30170

Gleeson, J.P., Van Rensburg, P.J.J., **Feeding ecology of the house mouse *Mus musculus* on Marion Island,** *South African journal of antarctic research,* 1982 Vol.12, p.34-39, With Afrikaans summary. 26 refs.

The house mouse at Marion Island are predominantly insectivorous but opportunistically omnivorous in their foraging strategy. *Pringleophaga marioni* larvae predominated in their diet, and these as well as adult weevils, their larvae and pupae and arachnids were preyed upon more intensely during winter. The main constituents of plant food types were *Agrostis magellanica* and *Poa cookii* seeds, the greater amount of plant material being taken during summer. Diet diversity and variety were moreover lower during winter as mice are apparently finding and consuming a wider variety of food during summer. Mice are therefore entering the ecosystem at the second (invertebrate herbivores) and third (invertebrate carnivores) trophic levels and have successfully adapted to cope with the high latitude insular terrestrial environment. (Auth.)

B-30171

Williams, A.J., Imber, M.J., **Ornithological observations at Gough Island in 1979, 1980 and 1981,** *South African journal of antarctic research,* 1982 Vol.12, p.40-45, With Afrikaans summary. Refs. p.44-45.

A bibliography of ornithological visits and a checklist of the birds of Gough Island are followed by a systematic account of incidental observations made on birds during expeditions to Gough Island during November 1979, October-November 1980, and September 1981. During these expeditions 33 species were observed of which six were recorded at Gough Island for the first time. The populations of *Eudyptes chrysocome* and *Diomedea exulans* were censused. Incidental notes include weight and mensural data and observations on prey consumed. (Auth.)

B-30172

Brown, C.R., Oatley, T.B., **Bird ringing at Marion and Prince Edward Islands, 1977-1982,** *South African journal of antarctic research,* 1982 Vol.12, p.45-48, With Afrikaans summary. 7 refs.

Bird ringing activities at Marion and Prince Edward islands are summarized for the period June 1977-May 1982. A total of 2,423 birds of 21 species was ringed during this period and 57 recoveries or recaptures were recorded at Marion Island. Only five birds have been recovered or recaptured elsewhere during the review period. Twenty-three foreign-ringed birds have been recorded on Marion Island and there is increasing evidence for movement of birds, including king penguins, between the Prince Edward islands and the Crozet islands. It is noted that ringing of birds at Marion Island is chiefly of value in studies of their breeding behavior but yields few data on post-breeding dispersal. (Auth.)

B-30174

Miller, D.G.M., **Cannibalism in *Euphausia superba* Dana,** *South African journal of antarctic research,* 1982 Vol.12, p.50, With Afrikaans summary. 7 refs.

Cannibalistic behavior was observed in captive *Euphausia superba.* The suggestion is made that such behavior may be utilized under natural conditions to offset low food availability. (Auth.)

B-30178

Honda, K., Sahrul, M., Hidaka, H., Tatsukawa, R., **Organ and tissue distribution of heavy metals, and their growth-related changes in antarctic fish, *Pagothenia borchgrevinki*** , *Agricultural and biological chemistry,* 1983 47(11), p.2521-2532, 41 refs.

The metal concentrations in whole fish in antarctic waters were lower for iron and mercury, and higher for cadmium, than in fishes from other oceans. Generally, high concentrations of the metals were observed in the liver, and low ones in the muscle. However, the concentrations of manganese, zinc, copper, lead and nickel were relatively high in the ovary and testis also, and those of manganese and zinc were the highest in the skin. Relatively high concentrations of cadmium and mercury were also found in the testis. Approximately 60% of the metal burden in whole fish was in muscle and bone which comprised an average of 80% of the body weight. However, a relatively high burden of iron, cadmium and mercury, in particular a high burden of cadmium, was found in the liver. The concentration of metals in the organs and tissues characteristically changed with the growth of the fish. The small fish showed faster uptake and excretion rates of metals than the large ones. The accumulation of cadmium and mercury depended on the exposure time. In contrast, for the accumulation of iron, manganese, zinc and copper, the metabolic turnover was a dominant factor. Results indicate that consideration of the growth stage of the organ and tissue is needed for detailed understanding of the bioaccumulation process and also for toxicological criteria of heavy metals. (Auth.)

B-30179
Ino, Y., **Photosynthesis and primary production in moss community at Syowa Station, Antarctica,** *Japanese journal of ecology,* Dec. 1983 33(4), p.427-433, 9 refs.

To estimate the primary production in an antarctic region, photosynthetic activity of moss communities was measured with an infrared gas analyzer at Showa Station in January 1982. At the same time, air and moss temperatures and light intensity were measured. The moss community was composed of *Ceratodon purpureus, Pottia heimii* and *Bryum pseudotriquetrum.* The relations between gross photosynthetic rate and temperature, and/or light intensity are discussed. (Auth.)

B-30187
Von den Steinen, K., **Zoological observations, Royal Bay, South Georgia 1882-1883. Part 2: penguins,** *Polar record,* May 1984 22(137), p.145-158, Translated by William Barr. For Part 1 see B-29488.

This is a second translated extract from an early account of the biology of South Georgia, written by the medical officer and zoologist of the German International Polar Year expedition to South Georgia in 1882-1883. This part of the report deals with a description of a variety of penguins encountered on the island; specifically, the gentoo, king, chinstrap, and macaroni penguins. Their behavior, breeding habits and morphology are described in detail. Several illustrations accompany the text.

B-30190
Scientific Committee on Antarctic Research, **SCAR bulletin No.77, May 1984,** *Polar record,* May 1984 22(137), p.221-246.

At the 17th meeting of SCAR, held in Leningrad in 1982, the Working Group on Biology reached a consensus on a draft of a new statement to replace the outdated statement of the biological program included in the *SCAR Manual* of 1972. The text of the draft, which includes additions and editorial changes, is given. In an article on southern ocean drilling, D.H. Elliot discusses proposed future programs. Minutes of various past SCAR working group meetings are also presented.

B-30194
Matthew, K., **Rockhopper penguin *(Eudyptes chrysocome)* record at Palmer Station, Antarctica,** *Auk,* Apr. 1982 99(2), p.384, 6 refs.

DLC QL671.N9

An adult male rockhopper penguin *(Eudyptes chrysocome)* with a broken wing was collected on Cormorant Island near Palmer Station. This locality is approximately 1,100 km from the nearest breeding area of the species, the islands off Cape Horn. (Auth.)

B-30202
Lipps, J.K., Hickman, C.S., **Origin, age, and evolution of antarctic and deep-sea faunas,** Environment of the deep sea. Rubey Volume 2. Edited by W.G. Ernst and J.G. Morin, Englewood Cliffs, Prentice-Hall, 1982, p.324-356, Refs. p.350-356.

DLC QH541.5.S3E58

Deep-sea and shallow antarctic marine environments are found to share a number of physical and biotic characteristics, but evidence supports the hypothesis that the two faunas have been evolving primarily in place, with minor immigration. Species living in each environment today are found not to be especially ancient. Morphological analysis of peculiarities of organisms from each environment establishes that gigantism, dwarfing, and certain bizarre constructions are a common response to resource limitation (food and skeletal materials). Associated with the morphological peculiarities are other adaptations for efficient utilization of resources including lowered metabolic rates, low reproductive output, brooding, and use of skeletal materials other than calcium carbonate.

B-30204
Weigmann-Haass, R., **Taxonomy and distribution of the genus *Cyllopus* Dana 1853 (Amphipoda: Hyperiidea) in the antarctic part of the Atlantic** [Zur Taxonomie und Verbreitung der Gattung *Cyllopus* Dana 1853 (Amphipoda: Hyperiidea) im antarktischen Teil des Atlantik], *Meteor Forschungsergebnisse,* Oct. 1983 D(36), p.1-11, In German with English summary. 28 refs.

Results of taxonomic investigations on 1137 specimens of *Cyllopus magellanicus* Dana 1853 and of 730 specimens of *Cyllopus lucasii* Bate 1962 are reported. A brief diagnosis and key are given for the genus and the species. For the first time larvae of the pantochelis stage of these species are described. The habitus of the larvae are very similar, small differences were found on the structures of the pereopod 3-6. Due to special morphological similarities it is concluded that the larvae of both species display a parasitic way of life like *Vibilia.* The distribution of the species in the antarctic ocean is circumpolar. (Auth.)

B-30220
Odening, K., **Sarcocysts in an antarctic seal** [Sarkocysten in einer antarktischen Robbe], *Angewandte Parasitologie,* Nov. 1983 24(4), p.197-200, In German with English and Russian summaries. 12 refs.

Sarcocysts (size 1.8-13 x 0.088-0.110 mm) were found in the skeletal musculature of a leopard seal from the South Shetland Islands. The entire cyst wall is approximately 1.5 microns thick and has very small, about 0.7-0.8 microns long, protrusions on its outer surface. The slightly curved cystozoites are 6-7 x 2-2.5 microns long. (Auth.)

B-30259
Odening, K., **Examination of south polar organisms and their environments** [Südpolare Organismen und ihr Lebensraum im Visier der Forschung], *Urania,* 1983 59(10), p.58-63, In German.

A brief overview is presented of the antarctic regions and the role of the GDR in this area. Mention is made of: the overall goal of all nations in Antarctica to preserve the region for peaceful scientific research under the Antarctic Treaty; biological resources and the BIOMASS program; biological research on seals and penguins and GDR relationships with SCAR and the USSR; effects of the surrounding ocean currents and the convergence and divergence zones; the dependence of the ecosystem on krill; and characteristics and effects of the hostile climate, the ice-free areas and the offshore and subantarctic islands.

B-30270
Kolakowski, E., Lachowicz, K., **Application of partial autoproteolysis to extraction of protein from antarctic krill (Euphausia superba). Part 3. Changes in and yield of nitrogen substances during autoproteolysis of fresh and frozen krill,** *Nahrung,* 1982 26(10), p.933-939, In English with German and Russian summaries. For Parts 1 and 2 see 12B-24229 and 12B-24230. 9 refs.

DLC TX341.N27

Respective utilities of the fresh and frozen (after a 10-month storage at -21 C) krill for precipitate production by means of partial autoproteolysis within 10-60 C were compared. The highest yield of the precipitate was found at about 20 C, regardless of the raw material used, although the optimal temperature ranges for the fresh and frozen krill were 20-30 C and 10-20 C, respectively. The main factors assisting the protein extraction during partial autoproteolysis were enzymatic protein hydrolysis in the fresh krill and the loosening of tissues brought about by water crystallization in the frozen krill. (Auth.)

B-30276

Fordyce, R.E., Mattlin, R.H., Dixon, J.M., **Second record of spectacled porpoise from subantarctic southwest Pacific,** *Tokyo. Whales Research Institute. Scientific reports,* March 1984 No.35, p.159-164, 20 refs.

An incomplete skull of unknown sex of a sub-adult spectacled porpoise *(Phocoena dioptrica* Lahille, 1912) was collected at Macquarie Island in July 1957. Cranial measurements are given, and the specimen is compared with other phocoenids. This is the second specimen of *P. dioptrica* reported from the subantarctic southwest Pacific, and this record adds support to the suggestion that the species may have a circumpolar distribution in subantarctic latitudes. (Auth.)

B-30277

Doidge, D.W., Croxall, J.P., Ricketts, C., **Growth rates of antarctic fur seal *Arctocephalus gazella* pups at South Georgia,** *Journal of zoology,* May 1984 203(1), p.87-93, 19 refs.

Large numbers of pups of the Antarctic fur seal were weighed at regular intervals through their rearing period in six seasons between 1972 and 1981 at South Georgia. Growth rates and birth and weaning weights were estimated from linear regressions of mean weight on mean age. Female pups had significantly lower growth rates and weaning weights than males, but higher variances for all growth parameters. This may reflect the importance to males of polygynous species of attaining high body weight. Except for an inverse relation between growth rate and birth weight there were no systematic relationships between growth parameters. Seasonal differences in growth rates were substantial and there was no indication that the continuing rapid population increase was affecting pup growth rates. The use of these data in detecting seasonal variations in local food availability is discussed. Preliminary estimates of the energy costs of pup rearing indicate that pup existence metabolism consumes c. 80% and mass gain to weaning only c. 15% of the energy provided by the female. (Auth.)

B-30278

Choi, S.H., Kato, H., **Changes in cooked odor of antarctic krill during frozen storage,** *Agricultural and biological chemistry,* Feb. 1984 48(2), p.545-547, 9 refs.

Two samples of krill frozen at -25 C, one kept in storage for one year the other for six months, were processed and the quality of the cooked odor concentrates evaluated. Tabulated data of the volatile components identified in both samples show that the quality of the odor decreases in direct proportion with the length of storage.

B-30279

Agerer, R., ***Leptoglossum omnivorum* n. sp. from Antarctica,** *British Mycological Society. Transactions,* Jan. 1984 82(1), p.184-186, 9 refs.

Leptoglossum omnivorum n. sp. is proposed and compared with other species of the genus *Leptoglossum* Karst., together with species formerly included in *Mniopetalum* Donk and Singer. (Auth.)

B-30291

Friedmann, E.I., Ocampo-Friedmann, R., **Antarctic cryptoendolithic ecosystem: relevance to exobiology,** *Origins of life,* 1984 14(1-4), International Conference on the Origins of Life, 7th, July 1983, p.771-776, 16 refs.

DLC QH 325.O72

Cryptoendolithic microorganisms in the Antarctic desert live inside porous sandstone rocks, protected by a thin rock crust. While the rock surface is abiotic, the microclimate inside the rock is comparatively mild. These organisms may have descended from early, pre-glaciation Antarctic life forms and thus may represent the last outpost of life in a gradually deteriorating environment. Assuming that life once arose on Mars, it is conceivable that, following the loss of water, the last of surviving organisms withdrew to similar insulated microenvironments. Because such microscopic pockets have little connection with the outside environment, their detection may be difficult. The chances that the Viking lander could sample cryptoendolithic microorganisms in the Antarctic desert would be infinitesimal. (Auth.)

B-30293

Tirrell, P.C., **Incubation physiology of the giant petrel *Macronectes giganteus*,** Binghamton, State University of New York, 1983, 177p., University Microfilms order No. 83-16361, Ph.D. thesis. Refs. p.157-171.

The giant petrel breeds on the Antarctic Peninsula during the austral summer. Ambient temperatures rarely exceed 5C, and therefore a large thermal gradient exists between the incubated egg and the environment. This gradient is maintained in part by heat input from the brood patch, a defeathered, hypervascularized, edematous area on the abdomen of both adults. The brood patch contains numerous arterio-venous anastomoses which facilitate heat transfer to the egg. Laboratory studies showed these large diameter, low resistance vessels to be under alpha adrenergic vasoconstrictive control, and to regulate blood flow in the brood patch in response to both adult body and egg temperature. Embryonic heat production helps maintain egg temperature, and mature giant petrel embryos contribute 33-35% of the total incubatory heat. (Auth.)

B-30294

Tracy, M.L., **Comparative energy metabolism of polar and temperate climate ascidians,** Davis, University of California, 1982, 209p., University Microfilms order No. 83-04794, Ph.D. thesis. Bibliography p.186-209.

Empirical relationships between energy metabolism and body mass in solitary ascidians were tested against the theoretical criteria of biological similarity proposed by Lambert and Teissier (1927). It was hypothesized that the relationships between actively metabolising body mass and standard energy metabolism in ascidians would be homomorphic (i.e. biologically similar). The results are examined within the conceptual framework of homomorphism and suggest that ascidians, like terrestrial mammals (Heusner, 1982), exhibit predictable relationships between mass and physiological time-scales, and homomorphism is a useful mathematical/physical model for expressing relationships between morphometric and physiological variables in a dimensionally consistent manner. (Auth.)

B-30297

Varshal, G.M., **Characterization of the mineral compositon of isolated krill proteins,** *Nahrung,* 1983 27(10), p.945-949, With German and Russian summaries. 11 refs.

Antarctic krill is considered to be a very promising source of food proteins and other biologically essential components, including microelements. In this article the microelement composition of krill proteins obtained by alkaline extraction is studied. The studies showed that the ash content of the isolated krill proteins is rather constant and does not depend on the different lots of krill. It could be demonstrated that isolated krill proteins are a source of biologically essential microelements. The fluorine and heavy metal contents are within allowable limits and do not restrict the use in food production. (Auth.)

B-30298

Jennings, J.C., Jr., Gordon, L.I., Nelson, D.M., **Nutrient depletion indicates high primary productivity in the Weddell Sea,** *Nature,* May 3, 1984 309(5963), p.51-54, 24 refs.

Oceanographic data collected aboard the Soviet icebreaker *Mikhail Somov* have allowed to derive a new productivity estimate, based on the seasonal depletion of nitrate, phosphate and silicic acid in the surface layer. From these depletions and data on the elemental composition of southern ocean phytoplankton, the average primary productivity in the Weddell Sea in the springtime was estimated. The most conservative estimate is 1.5-4 times higher than recently reported measurements of productivity in the open ocean areas of the southern ocean. The estimates are inherently averaged over time and space, including the effects of brief, intense spring blooms of phytoplankton which may occur near the receding ice edge. Studies of primary productivity based on isotope uptake experiments, particularly in the austral summer, may fail to account for the significance of such blooms. (Auth.)

B-30299

Rogozhin, S.V., **Electron-microscopic studies of structure formation of isolated myofibrillar proteins during the freezing-thawing process,** *Nahrung,* 1984 28(2), p.165-171, With German and Russian summaries. 19 refs.

Studies were conducted on texturizing of a krill myofibrillar protein paste by freeze-thaw treatment. Physico-mechanical characteristics of the products were evaluated by a uniaxial compression method, and examined by scanning and transmission electron microscopy. The freeze-thaw treatment considerably increased the elasticity modulus of the product; this is related to formation of thermo-irreversible gels by covalent bonding. The freeze-thaw texturized product had a porous spatial structure with meshes ranging from 540 to 2000 nm. Addition of disulphide bond reducing agents or SH group blocking agents prevents formation of porous structures.

B-30300

Benjamin, M., Norman, D., Scarborough, D., Santer, M., **Carbohydrate-containing endothelial cells lining the bulbus arteriosus of teleosts and the conus arteriosus of elasmobranchs (Pisces),** *Journal of zoology,* March 1984 202(3), p.383-392, 9 refs.

The study is a survey of the shape and carbohydrate histochemistry of the endothelial cells lining the conus arteriosus of 10 species of elasmobranchs and the bulbus arteriosus of 80 species of teleosts. Intensely PAS-positive cells that were often tall, were found in many teleosts and were typical of phylogenetically advanced species. They were not seen in any elasmobranch. Most of the teleosts with strongly PAS-positive cells were marine fish or euryhaline animals that were caught in freshwater. Beyond this, it is difficult to generalize on their life-style or habitat, for they included small fish, large fish, fast swimmers, bottom-living forms, deep-water fish, littoral species and Antarctic "bloodless" forms. It is likely that the PAS-positivity of the endothelial cells can be attributed to the moderately-dense granules revealed by E.M., but ast yet the significance of these is unclear. (Auth.)

B-30301

Doidge, D.W., Croxall, J.P., **Density-dependent pup mortality in the antarctic fur seal *Arctocephalus gazella* at South Georgia,** *Journal of zoology,* March 1984 202(3), p.449-460, 20 refs.

The extent and causes of pup mortality in the antarctic fur seal *Arctocephalus gazella,* were investigated at sites of high and low density at South Georgia. Most starvation was caused by failure of the mother-pup bond to form, often caused by disturbance induced by the activities of breeding bulls. Injury to the skull resulted from bites inflicted by females either accidentally during birth or when pups tried to suck from females other than their mother. Trampling of young pups by bulls was probably responsible for the appreciable incidence of ruptured livers. Infectious disease and drowning played minor roles in pup mortality. Food availability (both during and prior to the breeding season) and weather are likely to account for year to year variation in pup mortality rates but the basic rate is primarily determined by breeding density. Further population increase and colonization of new beaches is expected until food resources during the summer, or more probably the winter, become limiting. (Auth.)

B-30302

Griffiths, D.J., **Annual cycle of the epididymis of the elephant seal *(Mirounga leonina)* at Macquarie Island,** *Journal of zoology,* June 1984 203(2), p.181-191, 15 refs.

The tubules of the head and body of the elephant seal epididymis undergo large increases in diameter and principal cell height for the duration of the breeding season, and regress at the conclusion of breeding. The tubules of the tail show a lesser development, and only towards the end of breeding. Spermatozoa, first produced in the testis in August, reach the tail of the epididymis in September, and are present in large numbers throughout the epididymis in October and November. In December, the first month of sexual quiescence following the breeding season, sperm are almost totally absent from the epididymis. (Auth.)

B-30303

Griffiths, D.J., **Annual cycle of the testis of the elephant seal *(Mirounga leonina)* at Macquarie Island,** *Journal of zoology,* June 1984 203(2), p.193-204, Refs. p.203-204.

The testis of the southern elephant seal demonstrates seasonal changes in weight, with highest values early in the breeding season (September-November) and lowest values in mid-winter (May-June). Weight changes originate in the seminiferous tubules, there being little variation in the interstitial tissue. Spermatogenesis begins in August, one month before the breeding season, and stops in November. Testicular testosterone concentration is significantly elevated in the months July-September. Plasma testosterone concentration is high only in September, the first month of breeding. (Auth.)

B-30305

O'Grady, S.M., **Antifreeze peptides and glycopeptides in polar fishes,** Urbana-Champaign, University of Illinois, 1983, 117p., University Microfilms order No. 83-24613, Ph.D. thesis. Refs. p.109-116.

The first part of this thesis shows that polar fishes prevent freezing of intestinal fluid, as they maintain hydromineral balance, by secreting low molecular weight glycopeptides into the intestinal lumen. The second part shows that the winter flounder produce antifreeze peptides during the winter months but not during the summer. Changes in antifreeze concentration in plasma are preceded by an increase in levels of antifreeze mRNA. Such changes in mRNA levels in other systems have been shown to be induced by steroid hormones. Since winter flounder reproduce during the winter months, a possible relationship between the reproductive cycle and the induction of antifreeze synthesis is hypothesized. Results using immature winter flounder and isolated hepatocytes from adult (summer) animals show that both estrogen and testosterone have a stimulatory effect on the synthesis of antifreeze in winter flounder. (Auth.)

B-30308

Horrigan, S.G., **Biological processes affecting the distribution of nitrogen in the marine environment: contributions by phytoplankton and nitrifying bacteria,** San Diego, University of California, 1982, 106p., University Microfilms order No. 83-05014, Ph.D. thesis. Refs. p.89-91 and 105-106.

The contribution of two groups of autotrophic marine organisms —phytoplankton, represented by clones of two species of diatoms, and nitrifying bacteria—to observed distributions of the forms of nitrogen in some marine environments were investigated. Nitrogen uptake capabilities of phytoplankton were studied in laboratory culture. Kinetic studies of urea, a "regenerated" form of nitrogen, showed that the maximal rate of uptake of urea was invariant, but the length of time over which that rate was sustained varied with the degree of nitrogen depletion. Field studies on the activity of nitrifying bacteria were carried out in two different environments. Results indicated that nitrification may occur in waters beneath the Ross Ice Shelf, but nitrification probably does not occur in surface films, although nitrifying bacteria were present there. (Auth.)

B-30309

Bernstein, N.P., **Activity patterns, energetics, and parental investment of the antarctic Blue-eyed Shag *(Phalacrocorax atriceps bransfieldensis)*,** Duluth, University of Minnesota, 1982, 156p., University Microfilms order No. 83-01906, Ph.D. thesis. Refs. p.22-24 and 8090.

Precise daily activity rhythms are documented for the antarctic Blue-eyed Shags, and it was noted that the rhythms were sexually distinct. Hypotheses are discussed regarding pressures that might have influenced evolution of the rhythms. Time and energy budgets are used to examine parental investment in this monogamous, colonial seabird. Although time budgets between sexes were almost equal, males incubated eggs and brooded chicks more than did females. Although females forged for longer periods of time, both sexes fed chicks approximately equally. Because estimated energy costs were approximately the same for the activities that occupied most of the day, daily energy expenditures were about equal for both sexes throughout the breeding season. Courtship activities by the male compensated energetically for the female's cost of egg formation during the early part of the breeding season. (Auth.)

B-30314

Nast, F., **Assessment of krill *(Euphausia superba) Dana* biomass from a net sampling programme,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(3), p.154-165, 13 refs.

During January/February 1981 krill biomass was estimated in the southern ocean, using acoustic surveying and net sampling. Analysis of the net samples shows high variances between individual hauls in areas of high abundance of krill, whereas variances were lower in areas where krill were rare. This led to an assessment of krill biomass using a stratified mean value for the whole area which was calculated from means for areas of uniform densities of krill. A biomass of 1.36 million tons for the surveyed area is estimated. Systematic and random errors are discussed. (Auth.)

B-30315

Witek, Z., Pastuszak, M., Grelowski, A., **Net-phytoplankton abundance in western Antarctic and its relation to environmental conditions,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(3), p.166-180, 45 refs.

During antarctic oceanographic and biological investigations in 1976-1979 the phenomenon of low net-phytoplankton amounts, recurrent under certain circumstances and taking place in the vegetative season, was noticed. The relationship between phytoplankton amounts and nutrient concentrations, thermal water stratification and grazing by zooplankton, was considered. It was ascertained that the nutrients such as nitrates, phosphates, and silicates did not limit the primary production, whereas the type of water was of importance. Low net-phytoplankton amounts in coastal waters in summer following the spring bloom was noticed, but in oceanic waters phytoplankton occurred permanently during the whole vegetative period. The frequent occurrence of high concentration of krill *Euphausia superba* and other herbivorous zooplankton in regions scanty with net-phytoplankton is not believed to be the reason of low net-phytoplankton biomass. (Auth.)

B-30320

Spanovskaia, V.D., Lapin, V.I., **Ecology of *Cyclothone microdon* in the southern part of the Pacific Ocean,** *Journal of ichthyology,* 1981 21(6), p.33-37, Translated from Voprosy ikhtiologii. 16 refs.

DLC SH1.V713

Cyclothone microdon displays significant geographic variability. In the process of movement of the populations of this species from the lower to the higher latitudes, the maximum length of the fishes and their coefficient of condition increase, and the biochemical composition and liquid content of the body also change. In the Antarctic waters, this species attains maximum length and filling, but loses capacity for reproduction. (Auth.)

B-30321

Efremenko, V.N., Kotliar, A.N., Lisovenko, L.A., **Sex cycles, fecundity, and distribution of "limbless" soles of family Bothidae from the southwestern Atlantic,** *Journal of ichthyology,* 1981 21(6), p.89-99, Translated from Voprosy ikhtologii. 3 refs.

DLC SH1.V713

Histological structure of the testes and ovaries of "limbless" soles, *Mancopsetta maculata maculata, M. maculata antarctica, Neoachiropsetta milfordi, Archiropsetta tricholepis,* living in the southwestern part of the Atlantic Ocean was studied. Results are presented on collection of the planktonic eggs of *M. Maculata antarctica.* It is concluded that spawning of "limbless" soles takes place during the winter-spring period. (Auth.)

B-30322

Naumov, A.G., Svetlov, M.F., Kozlov, A.N., Pinskaia, I.A., **Distribution and feeding of *Electrona carlsbergi* Tåning (Myctophidae) in the Scotia Sea** [Nekotorye osobennosti raspredeleniia i pitaniia *Electrona carlsbergi* Tåning (Myctophidae) v more Skotiia], *Voprosy ikhtiologii,* 1981 21(3), p.467-472, In Russian. 11 refs.

DLC QL614.V6

The occurrence of *Electrona carlsbergi* is reported off South Georgia, in the austral summer of 1979, at depths of 80-200 m. The fish were found to perform diurnal vertical migrations associated with the distribution of food organisms. They fed mainly on Copepoda, Amphipoda and Euphausiacea, the daily consumption amounting to about 3% of their body mass.

B-30333

Andersen, K.I., Lysfjord, S., **Functional morphology of the scolex of two *Tetrabothrius* Rudolphi 1819 species (Cestoda; Tetrabothriidae) from penguins,** *Zeitschrift für Parasitenkunde,* July 1982 67(3), p.299-307, 13 refs.

DLC QL757.A48

The functional morphology of the scolex of two species of *Tetrabothrius* from penguins from Bouvet Island as revealed by scanning electron and light microscopy is described. These species, *T. pauliani* from chinstrap penguins and *Tetrabothrius* sp. from macaroni penguins possessed scoleces with a somewhat different appearance and the way in which they attach to the host gut also were different. In *T. pauliani* the auricles were well developed and played a major role in the attachment process while the bothridia functioned as lateral shallow suckers. In *Tetrabothrius* sp. the auricles were very small and played an inferior role in the attachment process while the bothridia acted as powerful anteriorly directed cup-like suckers. In addition the definition of and the difference between cyclophyllidean acetabula and Tetrabothriidean bothridia are briefly discussed. (Auth.)

B-30335

Zdanowski, M.K., **Nutritive value of *Euphausia superba* Dana evaluated in assay with *Tetrahymena thermopila* D III,** *Polska Akademia Nauk. Bulletin. Série des sciences biologiques,* 1980 28(8-9), p.491-496, In English with Russian summary. 19 refs.

DLC QH301.P6

The relative nutritive value of protein in dead krill remains determined in an assay with *Tetrahymena thermopila* D III is 88-109% relative to egg albumin hydrolyzate. During the *in situ* decomposition of krill in sea water there are no significant changes in the composition of essential amino acids of protein. On the other hand, substances such as vitamins, nucleosides and mineral salts which also contribute to the biological value of the krill as food undergo degradation and removal in these conditions. (Auth.)

B-30336

Kittel, W., Stepnik, R., **Distribution of *Euphausia crystallorophias, E. frigida, E. triacantha* and *Thysanoessa macrura* (Crustacea, Euphausiacea) in the southern Drake Passage and Bransfield Strait in February and March 1981,** *Polish polar research,* 1983 4(1-4), p.7-19, With Russian and Polish summaries. 17 refs.

The distribution and some apsects of the ecology of *Euphausia crystallorophias, Euphausia frigida, Euphausia triacantha* and *Thysanoessa macrura* are presented. The investigations show that *E. triacantha* is the northernmost and *E. crystallorophias* the southernmost species. These two species occur least frequently. *T. macrura* is the most numerous and the most regularly distributed species in the regions investigated. (Auth.)

B-30337

Ligowski, R., **Phytoplankton of the Olaf Prydz Bay (Indian Ocean, East Antarctica) in February 1969,** *Polish polar research,* 1983 4(1-4), p.21-32, With Russian and Polish summaries. 17 refs.

Qualitative and quantitative composition of phytoplankton of Prydz Bay was determined in 49 samples collected at 34 stations from Feb. 15 to 24, 1969. Altogether 59 taxa of algae were identified: 57 taxa of the class *Bacillariophyceae,* 1 species of the class *Chrysophyceae* and 1 genus of the class *Dinophyceae.* Species occurring most frequently and most abundantly in Prydz Bay are diatoms: *Thalassiothrix antarctica, Chaetoceros criophilus, Nitzschia curta,* and *Phizosolenia alata.* At some stations *Chaetoceros dichaeta* occurred in great numbers. A decrease in phytoplankton in areas south of 67 S is associated with the lack of neritic algae among dominant species. (Auth.)

B-30338

Żmijewska, M.I., ***Copepoda (Calanoida)* from Prydz Bay (Antarctica, Indian Ocean sector),** *Polish polar research,* 1983 4(1-4), p.33-47, With Russian and Polish summaries. 11 refs.

Studies carried out in February 1969 showed that the water circulation in Prydz Bay was of a cyclonic character. In the surface water layer higher temperatures were recorded to the south and lower to the north. The predominant species of *Copepoda* were: *Calanoides acutus, Calanus propinquus* and *Metridia gerlachei.* The highest numbers of *Copepoda* were observed in the southern part of the Bay. The development of the tested populations of *Copepoda* is zonated, asynchronous, and occurs earlier in the south than in the north. (Auth.)

B-30339

Skóra, K.E., Sosiński, J., **Observations on the ichthyofauna distribution in the regions of the Scotia Sea and Antarctic Peninsula,** *Polish polar research,* 1983 4(1-4), p.49-55, With Russian and Polish summaries. 12 refs.

Between December 1978 and March 1979 studies of the ichthyofauna distribution in the Scotia Sea and off the Antarctic Peninsula were carried out on board the *Profesor Siedlecki* during the Fourth Polish Marine Antarctic Expedition. Fishing was carried out using bottom and pelagic trawls. The presence of about 60 species of 15 families, including 17 species of *Nototheniidae,* 9 species of *Chaenichthyidae* and 7 species of *Bathydraconidae* was recorded. In west Antarctic waters the species *Trematomus centronotus* and *Austrolycichthys botriocephalus* were found. (Auth.)

B-30340

Ślósarczyk, W., **Juvenile *Trematomus bernachii* and *Pagothenia brachysoma* (Pisces, Nototheniidae) within krill concentrations off Balleny Islands (Antarctic),** *Polish polar research,* 1983 4(1-4), p.57-69, With Russian and Polish summaries. 30 refs.

Juvenile fishes of the family *Nototheniidae* were recorded during fishing for krill east of Balleny Islands. The paper describes juveniles of the most abundant species, *Trematomus bernacchii* and *Pagothenia brachysoma.* Their distribution, and the correctness of assigning some juveniles to the species *T. bernacchii* is also discussed. (Auth.)

B-30342

Linkowski, T.B., Presler, P., Żukowski, C., **Food habits of nototheniid fishes *(Nototheniidae)* in Admiralty Bay (King George Island, South Shetland Islands),** *Polish polar research,* 1983 4(1-4), p.79-95, With Russian and Polish summaries. 16 refs.

Analysis of food contents of 784 stomachs was made in 5 species of fishes of the family *Nototheniidae: Notothenia coriiceps neglecta, Notothenia rossi marmorata, Notothenia nudifrons, Trematomus newnesi* and *Pleuragramma antarcticum.* In the food of the first two species benthic forms predominated and among them *Amphipoda* were a decidedly preferred component. The composition of the food of *N. nudifrons* indicates that they feed at the bottom of the sea, the most preferred component of their diet, however, were pelagic *Salpae. T. newnesi* and *P. antarcticum* are characterized by a typically pelagic kind of food. A comparison of food composition and the values of the stomach fullness indices in *N. coriiceps neglecta, N. rossi marmorata* and *T. newnesi* in summer and winter seasons shows a markedly higher feeding intensity in the summer. (Auth.)

B-30343

Pietr, S.J., Tatur, A., Myrcha, A., **Mineralization of penguin excrements in the Admiralty Bay region (King George Island, South Shetland Islands, Antarctica),** *Polish polar research,* 1983 4(1-4), p.97-112, With Russian and Polish summaries. 23 refs.

Bacterial, enzymatic and chemical analyses show active microbiological mineralization and transformation of penguin excrements. The following physiological groups of bacteria were found: proteolitic, amonifying, nitrifying, lecithin degrading, Ca3(PO4)2 dissolving, chitin degrading and spore forming. The number of molds was not significant. Nitrate reducers and N2-fixing bacteria were not detected. About 50% of C and N were volatilized during three weeks. Some parts of N-NH3 was oxidized to N-NO3 in the surface layer of the soil. The content of P increased during degradation of penguin excrements. About 1/3 of total organic carbon content in bird excrements residues was derived from chitin. (Auth.)

B-30344

Tatur, A., Myrcha, A., **Changes in chemical composition of waters running off from penguin rookeries in the Admiralty Bay region (King George Island, South Shetland Islands, Antarctica),** *Polish polar research,* 1983 4(1-4), p.113-125, With Russian and Polish summaries. 28 refs.

Changes in chemical composition of the surface waters percolating through the soil and running off from the penguin rookeries are described. It was found that the chemical composition depends on the size and rate of precipitation, and also on the location of the rookeries. The longer and more complicated the runoff route of the waters, the more diluted are the solutions that reach the sea. In such case a significant part of phosphorus contained in the fecal materials may be retained on land, while most of ammonia volatilizes into the atmosphere. (Auth.)

B-30345

Lukowski, A.B., **DDT residues in the tissues and eggs of three species of penguins from breeding colonies at Admiralty Bay (King George Island, South Shetland Islands),** *Polish polar research,* 1983 4(1-4), p.127-134, With Russian and Polish summaries. 8 refs.

Eggs and samples of fat (blubber), muscles, and liver from three species of penguins, *Pygoscelis adeliae, P. antarctica* and *P. papua* were collected on king George Island in 1978. DDT residues were determined in the samples by gas chromatography. In the tissues pp'DDE and traces of pp'DDT were found; in the eggs, only pp'DDE was found. The highest DDT content (wet weight) was recorded in the fat, the lowest in the eggs. The differences between species in the mean values of the content of DDT residues in the tissues and eggs are not statistically significant. An increase in the level of pp'DDE concentration in the tissues and eggs was observed, as compared with earlier studies, as well as a tendency toward disappearance of the active form, i.e. pp'DDT, in the samples. (Auth.)

B-30347

Jurasz, W., Kittel, W., Presler, P., **Life cycle of *Branchinecta gaini* Daday, 1910, *(Branchiopeda, Anostraca* from King George Island, South Shetland Islands),** *Polish polar research,* 1983 4(1-4), p.143-154, With Russian and Polish summaries. 7 refs.

The occurrence of the crustacean *Branchinecta gaini* was observed in fresh-water ponds on King George Island. The morphology of the following developmental stages is described: *nauplius, metanauplius,* adult males, adult females, and gravid females with egg-sacs filled with eggs. The active phase of the life cycle of this species lasts 6 months (November-May). During that time one generation of *Branchinecta* develops. The reproductive season lasts from January until the freezing of the ponds. (Auth.)

B-30349

Petrushevskaia, M.G., **Bottom sediments of the Indian Ocean and Antarctic: radiolarian stratigraphy,** *Marine Biological Association of India. Journal,* Dec 1976 18(3) (Publ. June 1981), p.626-631, 9 refs.

Recent radiolarian fauna living to the south of the Antarctic-Polar Front is known to differ sharply from that living in the tropical regions of the Indo-Pacific. About 78% of the total number of radiolarians in antarctic bottom assemblage were unchanged in the last 1.6 million years. The ancient antarctic assemblage has been different from the then fauna of the low latitudes, but the difference was not so striking as it is now. The ancient fauna of the Antarctic Sea may be regarded as a temperate one. The recent radiolarian fauna of the low latitudes of the Indian Ocean is older than the antarctic fauna. About 2.5 to 2 million years ago the fauna of the low latitudes was very much the same as the recent, both as to the set of genera and species, and as to the population size. It is evident that in the last 3 million years the rapidity of the evolution of the radiolarian fauna was different in the high and low latitudes of the Indian Ocean. (Auth.)

B-30355

Taguchi, S., **Dark fixation of CO2 in the subtropical North Pacific Ocean and the Weddell Sea,** *Plankton Society of Japan. Bulletin,* Nov. 1983 30(2), p.115-124, Refs. p.123-124.

Dark 14CO2 fixation was measured in the subtropical North Pacific Ocean and the Weddell Sea. Spatial heterogeneity in dark 14CO2 fixation was observed in a given area and between areas. The variability seemed to be related to local water structure. Discrepancy between supply and consumption of dissolved organic C was identified and led to a further investigation such as an independent detailed study of a conversion factor between dark 14CO2 fixation and bacterial biomass production especially in a tropical ocean, and an effect of chemolithotrophic bacteria on dark 14CO2 fixation. (Auth.)

B-30357

Clarke, D.B., Ackley, S.F., Kumai, M., **Morphology and ecology of diatoms in sea ice from the Weddell Sea,** *U.S. Army Cold Regions Research and Engineering Laboratory,* CR 84-05, Feb. 1984 41p., ADA-141 994, Refs. p.12-14.

Diatom species composition and relative abundances were determined for ice cores obtained from Weddell Sea pack ice during the October-November 1981 Weddell Polynya expedition (WEPOLEX). Ice thickness and salinity indicate that the ice was less than one year old. The predominant ice type (70%) was frazil, which has the capacity to mechanically incorporate biological material through nucleation and scavenging. Diatoms were found throughout the length of the cores. Species showed down-core fluctuations in abundance that appeared to be correlated with changes in ice type. Pennate forms were more abundant than centrics, the average ratio being 16:1. Diatom frustules with intact organic material were more abundant (50 million cells/liter). Differences in species abundances are attributed initially to incorporation of algal cells from a temporally changing water column and subsequently to diatom reproduction within the ice. Scanning electron micrographs illustrating the morphologic characteristics of the predominant species are included.

B-30371

Allahpichay, I., Shimizu, C., **Supplemental effect of the whole body krill meal and the non-muscle krill meal of *Euphausia superba* in fish diet,** *Japanese Society of Scientific Fisheries. Bulletin,* May 1984 50(5), p.815-820, 28 refs.

To find an effective use for krill meal the nutritional quality and the growth-promoting effect of 5, 10 and 20 percent of whole body krill meal and non-muscle krill meal was studied as supplement in the diets of red sea bream *Chrysophrys major,* Japanese eel *Anguilla japonica,* and gray mullet *Mugil cephalus.* The non-muscle krill meal had a superior value for fish growth to the whole body krill meal. It is postulated that some factors that promote growth are present predominantly in the non-muscle krill meal. Chemical analyses such as general composition, amino acid composition and mineral composition of the krill meals and the white fish meal were conducted, but no noticeable difference could be found between the two krill meals. (Auth.)

B-30372
Allahpichay, I., Shimizu, C., **Extraction of growth promoting fractions from non-muscle krill meal of *Euphausia superba* and its effect on fish growth,** *Japanese Society of Scientific Fisheries. Bulletin,* May 1984 50(5), p.821-826, 3 refs.

This study was conducted to examine the effects of the various soluble fractions (70% MeOH, acetone, ethyl ether and water soluble fractions) separated from the extracts of non-muscle krill meal on the growth of fish. The growth promoting effect of each soluble fraction was tested by supplementing an equivalent amount separately to the test diets and carrying out 45-day feeding experiment on the red sea bream *Chrysophrys major* and the black sea bream *Mylio macrocephalus.* The test diets contain 70% MeOH soluble fraction of the MeOH: CHCl extract showed significantly greater growth than the diets containing other soluble fractions. The diet containing 70% MeOH extract also resulted in substantial gain in weight. (Auth.)

B-30378
Voskoboĭnikova, O.S., **Visceral skeleton changes in the process of turning to pelagic mode of life in fishes of the genus *Notothenia*** [Izmeneniia vistseral'nogo skeleta v protsesse pelagizatsii u ryb semeĭstva *Nototheniidae*], *Akademiia nauk SSSR. Zoologicheskiĭ Institut. Trudy,* 1982 Vol.114, p.67-76, In Russian. 35 refs.

The different species of the genus *Notothenia,* their differing visceral skeleton structure, and their adaptation to deep waters—the antarctic silverfish being defined as the best adapted notothenioid—are reviewed. The adaptation is linked to changes in the fish dietary habits, from various forms of plankton to the predation on krill.

B-30420
Lewis Smith, R.I., Clymo, R.S., **Extraordinary peat-forming community on the Falkland Islands,** *Nature,* June 14-20, 1984 309(5969), p.617-620, 10 refs.

Most of Beauchêne Island in the South Atlantic is covered by tussoc, the tussock-forming grass *Poa flabellata,* which has produced a deep accumulation of exceptionally dense peat during about 12,500 yr. The basal peat is lignitic, yet it is several hundred times too young to be a true lignite. During an ecological survey of the island in December 1980, an 11-m high peat face was sampled. The rate of decay found is within the range recorded for peats in corresponding latitudes in the Northern Hemisphere, but the rate of addition of dry matter is about 10 times as great. This is not easy to accommodate within current hypotheses about peat formation. An unusual combination of biological, physical and chemical circumstances may be the cause. (Auth.)

B-30421
Laws, R., **Antarctica: a convergence of life,** *New scientist,* Sept. 1, 1983 99(1373), p.608-616.

The complex food web of the Antarctic is surveyed and illustrated, and the status of seals, whales, birds, and krill is examined. Efforts by international groups of antarctic biologists to protect them are reviewed.

B-30422
Morris, D.J., Ricketts, C., **Feeding of krill around South Georgia. 1: A model of feeding activity in relation to depth and time of day,** *Marine ecology. Progress series,* Feb. 29, 1984 16(1-2), p.1-7, 18 refs.

Antarctic krill *Euphausia superba* were sampled from 4 depth horizons from a small area off South Georgia every 4 h for 6 days. Stomach, hepatopancreas and gut fullness of >9000 specimens were assessed visually. Plant pigment levels were measured in the stomachs and hepatopancreata of a subsample of the krill: the visual classification distinguished significantly different levels of plant pigment in both organs. Multivariate analysis of the number of krill in each depth, time and feeding category was used to generate a simple model of the relationships between stomach, hepatopancreas and gut fullness and to investigate how they varied with both depth and time of day. Both field techniques and analytic procedures represent an improved approach to the problem of understanding the simultaneous effects of environmental and physiological processes on krill feeding. Neither stomach, hepatopancreas nor gut fullness varied with depth, and only stomach fullness showed any significant variation with time of day. (Auth.)

B-30423
Ikeda, T., **Development of the larvae of the antarctic krill (*Euphausia superba* Dana) observed in the laboratory,** *Journal of experimental marine biology and ecology,* Feb. 20, 1984 75(2), p.107-117, 24 refs.

E. superba Dana larvae were raised successfully from eggs in the laboratory. Nauplii hatched within 8 days, and developed to Calyptopis I in 30 days at 0 C. Growth of Calyptopis I to the final larval stage (Furcilia VI) took an additional 97 days, using a mixture of *Artemia* nauplii and the diatom *Phaeodactylum tricornutum* Bohlin as food. Total development time from the egg to Furcilia VI was 127 days. The larvae showed a general preference for *Artemia* nauplii over *Phaedactlylum* cells. Overall gross growth efficiency determined on Calyptopis I through Furcilia VI was 45.9% for C and 44.7% for N, but was low when based on dry weight (29.7%). Calyptopis I ceased its continuous swimming mode within 6 days when kept in filtered sea water, suggesting that immediate food availability is an important factor in determining the successful further development of the larvae in the field. (Auth.)

B-30431
Piatkowski, U., Hempel, I., Rakusa-Suszczewski, S., **FIBEX cruise zooplankton data,** *Berichte zur Polarforschung,* 1984 No.16, 53p., In English with German summary. 3 refs.

This report summarises the sorting results of the zooplankton catches made during FIBEX (First International BIOMASS Experiment) on FRV *Walther Herwig* and RV *Meteor,* from January to March 1981, near the northern tip of the Antarctic Peninsula. In addition, a synopsis of krill larvae data collected by Polish and Argentine research vessels during FIBEX, is presented. (Auth.)

B-30433
Medvedev, F.A., Artiukova, O.A., Manasova, P.A., Levachev, M.M., **Effect of storage and thermal treatment on the fatty acid composition of the antarctic krill *Euphausia superba*** [Vliianie khraneniia i teplovoĭ obrabotki na sostav zhirnykh kislot lipidov antarkticheskogo krilia *Euphausia superba*], *Voprosy pitaniia,* Jan.-Feb. 1984 No.1, p.71-73, In Russian with English summary. 11 refs.

Gas liquid chromatography and chromato-mass-spectrometry were used to study and compare the fatty acid composition of lipids from the antarctic krill *Euphausia superba* shortly after catch and after storage for 6 months of thermally treated and then frozen krill. Fatty acid lipids were found to contain acids having a methyl group in the 2d position, and acids having an OH group in the 2d and 3d positions. The technological treatment did not produce any changes in fatty acid composition which might affect the biological value of the product under consideration. (Auth.)

B-30434

Bryden, M.M., Smith, M.S.R., Tedman, R.A., Featherston, D.W., **Growth of the Weddell seal, *Leptonychotes weddelli* (Pinnipedia),** *Australian journal of zoology,* 1984 32(1), p.33-41, 16 refs.

Weight more than tripled during the 6 wk suckling period in Weddell seals and increments in girth measurements were greater than increments in standard length. There was a very highly significant relationship between body weight and length and girth, but no consistent difference between the sexes in birth weight or growth during the suckling period. The distribution of body length frequencies and regression of body length on age of juvenile and adult seals, indicated that at all ages greater than 1 yr, females are larger than males. The mean length difference favoring females is approximately 6 cm. A multiple regression equation was derived that permits estimation of body weight from length and girth measurement. Relative weights and growth coefficients of several tissues and organs are recorded and discussed in relation to similar data from other species of marine mammals. (Auth.)

B-30443

Sahrhage, D., Gerlach, S.A., **Present knowledge of living marine resources in the Antarctic, possibilities for their exploitation and scientific perspectives,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.67-88, 13 refs. Comment by S.A. Gerlach, p.89-91.

The nutrient richness of antarctic waters is described and the varieties of marine life occupying these waters are identified. The food chain is shown with phytoplankton at the base being eaten by krill and krill being eaten by fish, penguins, seals, whales, and man. Effects of whaling and sealing in the 20th century, when several whale and seal species were nearly exterminated, are shown as great increases in krill which in turn provided additional food for other species to flourish and increase through earlier sexual maturation and controlled harvesting of whale stocks. These effects if supported by a complete ban on whaling could substantially contribute to the replenishment of devastated whale stocks. Taking an ethnological view, Gerlach poses the question: if whale stocks do increase, what will govern the wide variety of attitudes among global nationalities vis à vis killing and eating warm blooded animals or making a coat from their skins?

B-30456

Hiller, A., Wand, U., **Radiocarbon dating of breeding places of petrels in the Antarctic,** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.103-121, 40 refs.

An attempt is made to estimate the age of breeding places of petrels (snow petrel, Antarctic petrel) on the Antarctic continent by the radiocarbon dating method. The material used for dating was the so-called "mumiyo", solidified stomach oil of petrels, which can form up to 0.5 m thick irregularly stratified organic deposits around the nesting sites. Samples from three Antarctic localities have been studied: Mt. Provender, Shackleton Range (Site A); Wohlthat Massif, Queen Maud Land (Site B); and recent stomach oil of a cape pigeon from the Fildes Peninsula, King George Island, South Shetlands (Site C). The samples from Sites A and B gave surprisingly high maximum ages, namely, 9,000 yrs. BP and 4,000 yrs. BP, respectively. The results and their possible paleogeographic implications are briefly discussed. It is concluded that radiocarbon measurements are generally suitable for the dating of breeding places of petrels in the Antarctic. (Auth.)

B-30460

Clarke, A., **Lipid composition of two species of *Serolis* (Crustacea, Isopoda) from Antarctica,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.37-53, Refs. p.52-53.

The lipid content and composition of *Serolis pagenstecher* Pfeffer and *S. cornuta* Studer have been studied. The strikingly flat shape of serolids means that much of the animal is cuticle; as a result, over 50% of the dry weight is ash and 17% is chitin. The lipid content of males is about 1% fresh weight, individual variation being due mainly to alterations in the amount of stored triacylglycerol; phospholipid remains constant at about 4-5 micromol/g fresh weight. Females with maturing ovaries accumulate both triacylglycerol and phospholipid, increasing total lipid content to almost 4%. The fatty acid composition is typical of marine benthic crustaceans. Triacylglycerol fatty acids are generally more variable, less unsaturated and of shorter chain length than those from phospholipids. Several isomers of 20:1 and 22:1 are present in the triacylglycerols. Egg lipids are rich in monoenoic acids, and contain about 30 micrograms polyenoic fatty acids per egg. The pigments in adults serolids are mostly xanthophylls and both sexes contain astaxanthin. (Auth.)

B-30461

Smith, H.G., **Protozoa of Signy Island fellfields,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.55-61, 5 refs.

Twenty-one species of Protozoa (eleven flagellates, nine ciliates, one testate rhizopod) were identified in samples of twelve materials from four fellfield sites on Signy Island. The numbers of species in each material were positively correlated with percentage loss on ignition and, in the materials with low moisture and organic content, with pH also. Using similarity coefficient analysis it proved possible to ordinate the materials in a sequence which represented a series of protozoan communities of increasing species diversity and composed of species of increasing average dimensions. (Auth.)

B-30462

Lightowlers, P.J., **New variety of the moss *Tortula robusta* from South Georgia,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.63-66, 4 refs.

A recent revision of the genus *Tortula* on the sub-antarctic island of South Georgia indicated that *T. robusta* Hook. et Grev. shows continuous variation in leaf size and cell size, and *T. robusta* var. *laxa* Bartr., defined by its large leaves and large cells, is therefore considered to be a synonym of var. *robusta*. A discrete taxon was found, however, which differs from typical *T. robusta* in its oblong to oblong-lanceolate leaves which are always recurved when moist. Differences between this group and *T. fontana* (C. Muell.) Broth. of South Georgia and *T. rubra* Mitt. of New Zealand are also discussed. The oblong to oblong-lanceolate leaved taxon is described as *T. robusta* var. *recurva* P.J. Lightowlers *var. nova*. Brief details are given of a growth experiment that indicates that the variety probably has a genetic basis. (Auth.)

B-30463

Block, W., **Comparative study of invertebrate supercooling at Signy Island, maritime Antarctic,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.67-76, 17 refs.

The capacity for supercooling and the cryoprotective contents of 19 species of invertebrates collected from inshore marine (eleven species), freshwater (two species) and terrestrial (six species) habitats in summer 1981-82 were examined at Signy Island. All the species tested were freezing susceptible and individuals died at their supercooling points. Aquatic species generally exhibited poor supercooling ability (-5 to -9 C) compared with the terrestrial arthropods (-8 to -12 C), of which four species were high capacity supercoolers (<-20

C). Potential cryoprotectants were in lower concentrations (mostly <0.1% of fresh weight) in aquatic species than in terrestrial forms, where a four-component (glycerol, myo-inositol, glucose and trehalose) profile was identified. Considering the annual temperature range for each of the habitat categories it is unlikely that any of the aquatic invertebrates tested would be at risk from freezing in maritime antarctic conditions. Most of the terrestrial species avoid lethal freezing by extensive supercooling. (Auth. mod.)

B-30464

Ochyra, R., Bell, B.G., **Record of *Schistidium falcatum* (Bryophyta: Musci) from the Antarctic,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.77-79, 14 refs.

Schistidium falcatum (Hook. f. et Wils.) B. Bremer, a species hitherto unrecorded from the Antarctic, is reported from King George Island. A description together with notes on nomenclature, habitat and distribution are provided. (Auth.)

B-30465

Moyes, A.B., Doidge, D.W., **Composition of the mineral phase of dentine in southern elephant seal and antarctic fur seal teeth,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.81-84, 19 refs.

In this preliminary study, no chemical differences in the apatite structure have been observed between translucent and opaque bands in the teeth of male and female seals. It is suggested that the differences in the optical properties result either from the degree of mineralization or some aspects of the organic component such as tabule orientation. The Mg content, found in females up to twice as much as in males, is believed to be structurally incorporated in the apatite.

B-30506

Brothers, N.P., Skira, I.J., **Weka on Macquarie Island,** *Notornis,* June 1984 31(2), p.145-154, 17 refs.

Wekas have been on Macquarie Island for just over 100 years. They occur in the coastal tussock grassland, mainly in the northern half of the island. Males are larger than females and the sexes can be separated on a combination of culmen and tarsus lengths. The sex ratio in favour of males is considered to be due to behavioral differences. Breeding begins in August and, although four eggs may be laid, only one or two chicks are usually reared. Losses are probably due to predation by feral cats and skuas. Preferred foods are vegetation, insects and spiders. Mammal and bird remains were present in fewer than half the gizzards examined, but rats and mice are thought to be important food because of their size. (Auth.)

B-30507

Tomkins, R.J., **Some aspects of the morphology of Wandering Albatrosses on Macquarie Island,** *Emu,* March 1984 84(1), p.29-32, 5 refs.

Intensive observations of the Wandering Albatrosses on Macquarie Island in the subspecies *Diomedea exulans chionoptera* were made between 25 November 1976 and 7 March 1977. All nonbreeding birds seen were caught, banded, measured, their plumage scored using Gibson's plumage guide and photographed. Bands on birds banded in previous years were noted and actual or minimum ages ascertained. Criteria used for estimating sex were a bird's behavior with birds of known sex, its age and plumage, and observation on a breeding pair. Plumage scores using intermediate quarter categories are tabulated.

B-30508

Jouventin, P., Robin, J.P., **Olfactory experiments on some antarctic birds,** *Emu,* March 1984 84(1), p.46-48, 13 refs.

Field experiments conducted on the use of olfaction in birds breeding on the Adélie Coast confirmed findings of previous studies in captive birds: results indicate that the Cape Petrel, the Snow Petrel and the Wilson's Storm Petrel are able to locate food by using olfactory cues. Other breeding seabirds were seldom seen in the test area.

B-30530

Erickson, A.W., Hanson, M.B., Kehoe, D.M., **Population densities of seals and whales observed during the 1983 circumnavigation of Antarctica by the USCGC *Polar Star*,** *Antarctic journal of the United States,* 1983 18(5), p.163-166, 3 refs.

From Jan. 21 to Mar. 6, 1983 seal and whale censuses were conducted in the southern ocean during the circumnavigation of Antarctica by the USCGC *Polar Star.* Seventeen aerial transect surveys were flown, and 584 square nautical miles of pack ice area were censused. Totals of 2,727 seals, 1,188 penguins, and 31 minke whales were observed during these censuses. Shipboard censuses of seals totaled 445 square nautical miles distributed over 33 geographic areas and yielded counts of 2,005 seals, 5,027 penguins, and 121 minke whales. The density of seals observed in the 1983 survey tended to be lower than was observed in surveys conducted earlier. This is due in part to the fact that very few of the 1983 censuses were centered on the midday peak haulout period. A total of 5,937 square nautical miles of whale census was performed during 42 census periods. These surveys yielded a count of 626 whales representing seven species. Whale density was one whale per 9.5 square nautical miles. Detailed tabular data summarize the results of these studies.

B-30531

Hunt, G.L., Jr., Veit, R.R., **Marine bird distribution in antarctic waters,** *Antarctic journal of the United States,* 1983 18(5), p.167-169, 7 refs.

As part of the Arms Control and Disarmament (ACDA) circumnavigation cruise of the antarctic continent from Jan. 21 to Mar. 6, 1983 studies were made of bird species distribution and abundance in the East Wind Drift off Antarctica and off Southern South America aboard the USCGC *Polar Star.* Particular interest was focused on examining the variation in bird species composition and density between distinct hydrographic boundaries. Data are summarized for the following observations: concentrations of birds, distribution patterns, the influence of oceanographic conditions on bird density, species around the South Orkney Islands, the association between mammals and birds, and species associated with hydrographic fronts and water masses between Punta Arenas and Rio de Janeiro, South America.

B-30532

Hewes, C.D., Holm-Hansen, O., Sakshaug, E., **Nanoplankton and microplankton studies during the circumnavigation cruise,** *Antarctic journal of the United States,* 1983 18(5), p.169-171, 3 refs.

The specific objectives of these studies, conducted during the antarctic circumnavigation cruise were: (1) to document the biomass and cell-size distribution of phytoplankton in surface waters as related to water depth (shelf versus deep waters) and to degree of ice cover, (2) to determine the ratio of heterotrophic to autotrophic biomass in the microbial fraction, (3) to estimate the magnitude and effects of the grazing pressure exerted by heterotrophic microplankton organisms on the species composition and biomass of the nanoplankton, and (4) to determine the chemical composition and growth rates of phytoplankton as a function of light intensity. Phytoplankton biomass was high in shelf waters in both the Weddell Sea and transects north and south of the South Orkney Islands and decreased dramatically to low values when the depth exceeded 1,000 m. Phytoplankton biomass associated with ice cover was also impressive.

B-30533

Fisher, S.R., Ferm, L.M., Thomas, J.A., **Circumpolar acoustic surveys for marine mammals using a towed hydrophone array,** *Antarctic journal of the United States,* 1983 18(5), p.171-173, 13 refs.

The application of a towed hydrophone array for acoustic surveys of marine mammals in antarctic waters was tested during the circumpolar navigation of the *Polar Star* from Jan. 21 to Mar. 6, 1983. Visual contacts of marine mammals varied from occasional periods during which large concentrations were sighted to long periods of no sightings, yet they occurred throughout the track. However, during 200 hours of towing, marine mammals were detected acoustically only once. Probable reasons for this are outlined. A variety of whistles, screams, and pulses were heard from about 30 pilot whales. Because there are no other recordings of southern hemisphere pilot whales, this information is valuable for comparing regional dialects.

B-30534

Vargo, G.A., Fanning, K.A., Bell, L.M., **Antarctic plankton and the marine geochemistry of radium-226, barium, and germanium,** *Antarctic journal of the United States,* 1983 18(5), p.174-176, 19 refs.

Oceanic concentrations of dissolved Ra-226, Ba, and Ge show good linear correlations with those of dissolved silicon, suggesting that diatoms may incorporate those elements in their frustules and remove them from seawater. The importance of Antarctic phytoplankton to the removal depends on their incorporation ratios of Ra-226:Si, Ba:Si, and Ge:Si and on their growth rates. Plankton and seawater samples were collected along the ice edge on a westward navigation from the Ross Sea to the Weddell. Incorporation rates will be determined from growth rate in cultures of natural populations, and incorporation ratios from element:Si ratios in the samples. Initial data suggest ice flora, especially *Fragilariopsis* spp., may be of major importance.

B-30535

Sullivan, C.W., Palmisano, A.C., Kottmeier, S., Grossi, S.M., Moe, R., Taylor, G.T., **Influence of light on development and growth of sea-ice microbial communities in McMurdo Sound,** *Antarctic journal of the United States,* 1983 18(5), p.177-179, 10 refs.

A large scale light attenuation experiment was conducted on the annual sea ice of McMurdo Sound during a three month period from October until January, 1983. The purpose of the experiment was to determine the influence of light on development and growth rate of the SIMCO and in turn to determine the influence of SIMCO on the underice light field (downwelling irradiance and spectral composition). Five pairs of quadrats 100 sq m each were cleared of all snow or were covered with snow to a depth of 5, 10, 25 or 100 cm in order to vary underice irradiance. Microbial growth, accumulation and metabolic rate estimates were made of the SIMCO which developed in brine channels of the congelation ice and interstitial waters or on ice crystal surfaces of the underwater platelet ice layer. Downwelling irradiance and spectral composition of light at the sea ice surface, under 2 m of congelation ice and under congelation ice plus platelet ice containing the SIMCO was determined by SCUBA divers using a spectroradiometer. The studies demonstrate that SIMCO's are not only significant sources of primary and secondary production, but that they also influence the physical environment of polar ecosystems in important ways.

B-30536

Garrison, D.L., Buck, K.R., Silver, M.W., **Studies of ice-algal communities in the Weddell Sea,** *Antarctic journal of the United States,* 1983 18(5), p.179-181, 12 refs.

This report summarizes the results of population studies, indicating a close coupling between algal assemblages in ice and water in the Weddell Sea and suggesting the source of ice-algal populations. Many algal species were common to both ice and water, but none were exclusively associated with ice. *Phaeocystis pouchetii* and several diatom species were the numerically important algae. Observations on newly forming ice suggested that algal populations in the samples were initially entrapped but also concentrated during frazil ice formation. It is concluded that planktonic algae are regularly incorporated into sea ice, that they overwinter in ice, and that they are released into the water column during ice melting in the spring and summer over a prolonged period, thus explaining the marked similarity between ice and water column assemblages in this region.

B-30537

Clarke, D.B., Ackley, S.F., **Relative abundance of diatoms in Weddell Sea pack ice,** *Antarctic journal of the United States,* MP 1786, 1983 18(5), p.181-182, 12 refs.

Diatoms were found throughout the length of sea ice cores (average length, 75 cm) taken from the Weddell Sea during the Oct.-Nov. 1981 joint U.S.-U.S.S.R. study. As in previous studies it was found that the pennate forms were dominant. *Chaetoceros dichaeta* Ehrenberg was the only centric species which was "abundant" in the samples, and it has not previously been reported as abundant. Of the pennate species found in abundance, three have been found in abundance by other authors. These are *Nitzschia closterium* (Ehrenberg) W. Smith, *Nitzschia cylindrus* (Grunow) Hasle, and *Nitzschia subcurvata* Hasle. Also found to be numerically significant in the samples were *Nitzschia prolongatoides* Hasle, *Nitzschia turgiduloides* Hasle, *Tropidoneis glacialis* Heiden, and an unidentified *Navicula* species. The table lists the dominant species in each sample and their relative abundances. Five of these species have not previously been found in abundance in antarctic sea ice. Possible reasons for the variable species compositions in samples are discussed.

B-30538

Jones, T.W., Morris, I., **Effect of prolonged darkness on the patterns of photosynthesis in antarctic diatoms,** *Antarctic journal of the United States,* 1983 18(5), p.183-185, 7 refs.

To investigate the effect of prolonged darkness on short-term photosynthetic end-products of phytoplankton brought back into the light, laboratory experiments were conducted using antarctic diatom isolates (Bigelow Laboratory Culture collection). The temperate diatom, *Thalassiosira pseudonana* (3H), was also used for comparison purposes. Exponentially growing cultures were placed in the dark following an initial uptake procedure. The 3-step procedure is described. An increase of fixed carbon into the lipid fraction following extended periods of darkness was observed in an unidentified antarctic isolate but not in *T. pseudonana*. Instead *T. pseudonana* incorporated more newly fixed carbon into the LMW component. In both cases, the fraction that was negatively affected by prolonged darkness was protein. Also there was considerable species-to-species variability. Time-course experiments performed in the lab have indicated that there is considerable apparent protein synthesis during the dark period of a normal light/dark cycle at the expense of lipid and/or LMW compounds in these algae.

B-30539

Fryxell, G.S., Buck, K.R., Theriot, E.C., **Phytoplankton from the southwestern Atlantic and Indian Oceans,** *Antarctic journal of the United States,* 1983 18(5), p.186-188, 15 refs.

The biology of antarctic phytoplankton and its relationship to krill are being examined from collections made in cooperative cruises with British Antarctic Survey on board the RRV *John Biscoe* and the South African *Agulhas,* from the area around South Georgia and north of Queen Maud Land, respectively. Clonal cultures have been established and related to the field samples, showing that resting spore formation is more common in the area than had been believed. Quantitative studies reveal that both autotrophic and heterotrophic nanoplankton are important in the dynamic ecosystem of the antarctic waters. The planktonic diatom genus *Thalassiosira* is being studied from an area of high biomass, where *Chaetoceros* also was abundant.

B-30540
El-Sayed, S.Z., Weber, L.H., Kopczyńska, E.E., **Phytoplankton studies in the sector between Africa and Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.188-190, 4 refs.

Studies are reported of phytoplankton species and containment effects in water samples collected in the sector between Africa and Antarctica during cruises aboard the South African research vessel *Agulhas.* Eighty percent or more of the variability in nearly all the measured parameters—photosynthesis, extracellular excretion, chlorophyll, phaeopigments, pigment ratio, ATP and total adenylates was accounted for by the station location and the period of incubation. The most striking observation was a consistent exponential decrease in chlorophyll over time. The results confirm that, similar to tropical phytoplankton, high latitude communities are sensitive to containment even for short periods of time.

B-30542
Lawrence, J.M., McClintock, J.B., **Biomass and caloric studies on marine invertebrates and algae at Kerguelen, southern Indian Ocean,** *Antarctic journal of the United States,* 1983 18(5), p.183-185, 12 refs.

An energetic analysis of the reproduction in the brooding heart urchin *Abatus cordatus* and a brooding starfish was initiated. The number of brooded eggs or juveniles were counted and weighed and will be used to ascertain the energetic reproductive output and costs of development. A quantitative transect of a rocky intertidal area in the Baie du Morbihan showed distinct zonation with high biomass of both macroinvertebrates and macroalgae. Encrusting coralline algae and chitons occupied the highest tide pools; leafy macroalgae, mussels, chitons and anemones occupied the mid-level tide pools; low-growing macroalgae and mussels occurred at extreme low tide levels below the *Durvillea* belt.

B-30550
Vogel, M., Remmert, H., Smith, R.I.L., **Introduced reindeer and their effects on the vegetation and the epigeic invertebrate fauna of South Georgia (Subantarctic),** *Oecologia,* 1984 62(1), p.102-109, 27 refs.

The introduced reindeer of South Georgia have had a serious impact on the vegetation throughout the range of three populations on the island. Exclosure experiments in areas where the reindeer were introduced resulted in a dramatic change in the composition of the protected vegetation. *Poa flabellata* (the major winter food) and *Acaena magellanica* (a major summer food) recovered to their former status inside the exclosures: *Deschampsia antarctica* and the introduced grass *Poa annua* tolerate grazing and trampling and have spread over the grazed areas. *Festuca contracta* and *Rostkovia magellanica* are not eaten by the reindeer. Trampling resulted in a high proportion of bare soil and peat in sites freely accessible to reindeer. The changes in the vegetation did not have such a significant effect on the associated invertebrate fauna. Compared with reindeer-free areas, the abundance of the perimylopid beetle *Hydromedion sparsutum* (a major primary decomposer) is reduced. The frequency of their egg parasite *Notomymar aptenosoma* increases. (Auth.)

B-30551
Yamazaki, T., Ito, A., Nozaki, Y., Narita, S., Hirota, S., **Astaxanthin content of silver salmon *(Oncorhynchus kisulch),*** *Japanese journal of nutrition,* Dec. 1983 41(6), p.391-395, In Japanese with English summary. 9 refs.

It was confirmed by experiment that redness in muscles of artificially bred silver salmon was mainly due to the presence of the carotenoid pigment, astaxanthin. Silver salmon were fed a diet supplemented with krill *(Euphausia superba* Dana) containing 4.13 mg/100 g astaxanthin, to enhance redness in the muscle, and changes in astaxanthin content during growth were investigated. While almost no astaxanthin was detected in young silver salmon (150-200 g body wt.), astaxanthin content increased to 2.5 kg. This value was almost the same as that of naturally grown three year old silver salmon. Astaxanthin content rapidly increased after 6 months. (Auth.)

B-30553
Mikell, A.T., Jr., Parker, B.C., Simmons, G.M., Jr., **Response of an antarctic lake heterotrophic community to high dissolved oxygen,** *Applied and environmental microbiology,* May 1984 47(5), p.1062-1066, 30 refs.

The upper waters of Lake Hoare contain dissolved O2 at about three times the normal saturation. The response of the heterotrophic plankton community to this high dissolved O2 was evaluated by the criteria of CFU [colony forming units] and D-[U-14C]glucose assimilated-respired. High dissolved O2 was not inhibitory to D-[U-14C]glucose assimilation-respiration compared with normal atmospheric dissolved O2 in Lake Hoare water. The D-[U-14C]glucose was assimilated and respired optimally at 12 deg C in Lake Hoare. The D-[U-14C]glucose assimilated-respired in the upper saturated atmospheric dissolved O2 waters of Mountain Lake, Virginia, USA was inhibited in contrast to Lake Hoare ($P < 0.05$). CFU formation was inhibited in both lakes. CFU represent $< 1\%$ of the fluorochrome-stained direct counts in Lake Hoare. Lake Hoare planktobacteria are smaller than the planktobacteria in Mountain Lake. ATP size fractionation revealed that 39% of the ATP biomass was < 0.5 micron in Lake Hoare. (Auth.)

B-30554
Sullivan, C.W., Palmisano, A.C., **Sea ice microbial community: distribution, abundance, and diversity of ice bacteria in McMurdo Sound, Antarctica, in 1980,** *Applied and environmental microbiology,* April 1984 47(4), p.788-795, 41 refs.

An abundant and diverse bacterial community was found within brine channels of annual sea ice and at the ice-seawater interface in McMurdo Sound in 1980. Vertical profiles of ice cores 1.3-2.5 m long showed that 47% of the bacterial numbers and 93% of the bacterial biomass were located in the bottom 20 cm of sea ice. Ice bacterial biomass concentration was > 10 times higher than bacterioplankton from the water column. Scanning electron micrographs showed a variety of morphologically distinct cell types, including coccoid, rod, fusiform, filamentous and prosthecate forms; dividing cells were commonly observed. Approximately 70% of the ice bacteria were free-living and 30% were attached to living algal cells or detritus. Interaction between ice bacteria and microalgae was suggested by a positive correlation between bacterial numbers and chlorophyll *a* content of the ice. Scanning and transmission EM revealed a close physical association between epibacteria and a dominant ice alga of the genus *Amphiprora.* It is proposed that sea ice microbial communities are not only sources of primary production, but also sources of secondary microbial production in polar ecosystems and that a detrital food web may be associated with polar sea ice. (Auth.)

B-30555
Matsumoto, G., Torii, T., Hanya, T., **Vertical distribution of organic constituents in an antarctic lake: Lake Vanda,** *Hydrobiologia,* April 20, 1984 111(2), p.119-126, Refs. p.125-126.

Vertical distribution of organic constituents, i.e., total organic carbon (TOC), extractable organic carbon with ethyl acetate (EOC),

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hydrocarbons, phytol, sterols, fatty acids and phenolic acids, in Lake Vanda was studied to elucidate their features in relation to the stratification of lake water and the distribution of lake organisms. The concentrations of TOC, EOC and sterols increased with depth and attained the maximum values of 25 and 1.5 mgC/l and 1.4 microgram/l in the bottom, respectively. Fatty acids showed the maximum value of 61 microgram/l at depth of 55.4 m, along with the highest value of the ratio of unsaturated to saturated acids and with the highest carbon preference index. Hydrocarbons were only found in the bottom layers (60.4 and 65.9 m) and bottom sediment. (Auth.)

B-30556

Burger, A.E., **Winter territoriality in lesser sheathbills on breeding grounds at Marion Island,** *Wilson bulletin,* March 1984 96(1), p.20-33, Refs. p.31-33.

Lesser sheathbills *(Chionis minor)* were studied at Marion Island. During the winter nonbreeding season pairs defended their breeding territories in King penguin colonies against adult and subadult intruders, but they permitted their juvenile offspring to forage within the territories. Adults defended the territories at apparently little cost and gained immediate benefits by having greater access to higher quality food than the intruders. Their offspring also benefitted by avoiding much of the aggressive competition for food, enhancing their survival. (Auth.)

B-30559

Usher, M.B., Bowring, M.F.B., **Laboratory studies of predation by the antarctic mite *Gamasellus racovitzai* (Acarina: Mesostigmata),** *Oecologia,* 1984 62(2), p.245-249, 14 refs.

Laboratory investigations of predation by *G. racovitzai* (Acarina: Mesostigmata) on *Cryptopygus antarcticus* (Insecta: Collembola) are described. The predator appeared to search at random, but, when contact with prey had been made, a rapid attack involved looping the forelegs over the prey to hold it while the chelicerae moved forward horizontally to puncture the side of the prey. The mean predation rate by deutronymphs, approximately 1 prey per predator per 12 days, was independent of prey density, but with adults this rate increased to about 1 prey per predator per 3 days. A study of leg geometry predicted a maximum prey size that could be captured: some experimental evidence suggested that mites selected prey near to this predicted size. The contribution of the laboratory results towards understanding the dynamics of field populations is discussed. (Auth.)

B-30563

Todd, F.S., **Antarctica comes to California: the Penguin Encounter at Sea World,** *Antarctic journal of the United States,* June 1984 19(2), p.9-12, 3 refs.

The development of the Hubbs-Sea World penguin facility is outlined from its inception in 1972 to its opening in 1983. Several species of penguins and other birds were flown from Antarctica in refrigerated planes to California and have thrived and prospered to the extent that they have formed self-perpetuating colonies. Construction and operation of the exhibit, which closely simulates the natural habitat, is described. In addition to the public exhibit, research projects are being undertaken, one of which involves bringing fertile eggs rather than live birds from Antarctica.

B-30573

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol.6, No.1,** College Station, Texas A and M University, July 1984, 20p.

Included in this issue are reports on: the BIOMASS executive meeting in Cambridge in June for discussions on SIBEX Phases II and III and several of the working groups; the decision to house the BIOMASS data base at BAS; the acoustic working group meeting in Hamburg and the SCOR WG 70 meeting in Kiel; INCN/SCAR Symposium in 1985; the COSPAR Workshop on antarctic satellite observations; SIBEX Phase I by the Chief Scientists of Argentina, Australia, Brazil, Chile, Federal Republic of Germany, France, Japan, Poland, South Africa, United Kingdom, and United States in which a summary is given of the science programs conducted from research vessels of the various nations, and recent publications and book reviews.

B-30580

Wilson, G.J., Taylor, R.H., **Distribution and abundance of penguins in the Ross Sea sector of Antarctica,** *New Zealand antarctic record,* 1984 6(1), p.1-7, 20 refs.

Data is presented of the numbers of nests, chicks, and adult birds of Emperor, Adélie, and Chinstrap species in the area between 160 E and 150 W. All known colonies in the Ross Sea region are listed with their locations, numbers of breeding pairs and other data. Brief remarks are given on the distribution of Emperors and Adélies. Chinstraps in the Ross Sea area are limited to a single colony on the Balleny Islands.

B-30585

Brown, C.R., **Resting metabolic rate and energetic cost of incubation in Macaroni Penguins *(Eudyptes chrysolophus)* and Rockhopper Penguins *(E. chrysocome),*** *Comparative biochemistry and physiology,* 1984 77A(2), p.345-350, 23 refs.

Oxygen consumption of resting and incubating macaroni and rockhopper penguins was measured at Marion Island. Resting metabolic rate of macaroni penguins of mean mass 3779 g averaged 1160.7 kJ/day and that of rockhopper penguins of mean mass 2506 g averaged 862.8 kJ/day. Incubating metabolic rates were 1031.8 kJ/day for macaroni penguins of mean mass 4839 g and 7014 kJ/day for rockhopper penguins of mean mass 2767 g. Energetic cost of incubation was significantly lower than resting metabolic rate in both species but was close to predicted values of basal metabolic rate for birds of equivalent masses. Incubation may not be energetically expensive for small penguins and incubating metabolic rate may represent a better indication of basal metabolic rate than does resting metabolic rate (Auth.)

B-30586

Hirche, H.-J., **Temperature and metabolism of plankton—1. Respiration of antarctic zooplankton at different temperatures with a comparison of antarctic and nordic krill,** *Comparative biochemistry and physiology,* 1984 77A(2), p.361-368, Refs. p.367-368.

Direct response of 6 common antarctic zooplankters *(Euphausia superba, Calanoides acutus, Euchaeta antarctica, Parathemisto gaudichaudii, Hyperiella antarctica,* and *Tomopteris carpenteri)* to temperature changes was measured and their temperature tolerance tested. Respiration rates followed the Arrhenius equation in the range examined. Temperature coefficients varied between 8.06 and 23.84, while Q10 values from 1.64 to 5.24 were found. When krill data were compared with experiments on North Sea *Meganyctiphanes norvegica,* no significant difference was found for Arrhenius coefficients. No mortality occurred within 30 hr at temperatures from -1 to 10 C. The results are discussed with regard to the concept of metabolic cold adaptation. (Auth.)

B-30587

Burchett, M.S., **Age determination of *Notothenia rossii* from South Georgia (Antarctica) using scales and otoliths,** *Cybium,* June 30, 1984 8(2), p.19-28, With French summary. 14 refs.

Age determination of *Notothenia rossii* sampled nearshore was carried out using scales and otoliths. Otolith development during the life-cycle is described. Otoliths were either examined whole or embedded in polyester resin, thin sectioned and examined under the microscope. Analysis of otolith and scale structures of blue phase fingerlings and young offshore specimens showed no evidence of pelagic fingerlings overwintering at sea before migrating to coastal habitats nearshore. Within a few weeks of arrival nearshore, the fish changed to a demersal brown phase fingerling at the stage when 9-11 circuli were present on the scales. The nearshore population of *N. rossii* consisted mainly of age classes O-V with a total length range of 41-450 mm. There was considerable change in the external shape and morphological structure of otoliths with increasing age of *N. rossii* during the first five years, however once maturity was reached further otolith changes were minimal although the structure continued to grow in size. (Auth.)

B-30588

Abyzov, S.S., Filippova, S.N., Kuznetsov, V.D., ***Nocardiopsis antarcticus*--a new species of actinomycete isolated from a glacial thickness in Central Antarctica,** *Akademiia nauk SSSR. Izvestiia. Biology bulletin,* July-Aug. 1983 No.4, p.310-318, 46 refs.

For Russian original and abstract see B-29180 or 38-1698.

B-30589

Gillette, J., Bartle, J.A., **Catalogue of anatomical specimens of living or recently extinct birds in the National Museum of New Zealand (NMNZ),** *National Museum of New Zealand. Miscellaneous series,* June 1982 No.5, 18p., 3 refs.

Antarctic and subantarctic species are included in the anatomical collection of world birds catalogued by the National Museum of New Zealand. The catalogue is arranged in systematic order following the Annotated Checklist of the Birds of New Zealand and its Amendments and Additions. The nomenclature and taxonomy of these lists is also followed. Subfossil and fossil specimens are not included.

B-30591

Bourne, W.R.P., David, A.C.F., Jouanin, C., **Probable garganey on St Paul and Amsterdam Islands, Indian Ocean,** *Wildfowl,* 1983 No.34, p.127-129, 13 refs.

DLC SK351.W575

Old accounts from St. Paul and Amsterdam Islands, and bones from the first, indicate the presence of a small, dark endemic form of garganey which was exterminated by sealers and introduced predators between one and two centuries ago. (Auth.)

B-30593

Avdeev, G.V., **New harpacticoid copepods (Tisbidae), parasites of octopuses in the Ross Sea** [Novye garpaktikoidnye kopepody semeĭstva Tisbidae—parazity os'minogov v more Rossa], *Zoologicheskiĭ zhurnal,* Dec. 1983 62(12), p.1775-1785, In Russian with English summary. 5 refs.

Diagnoses of *Yunona* n. gen., and *Tripartisoma* n. gen., are provided and *Y. marginata* n. sp., *T. trapezoidalis* n. sp. and *T. ovalis* n. sp., are described. They are parasites of octopuses. *Yunona* is closely related to *Neoscutellidium* Zwerner 1967, but has a different outline of the cephalothorax, 8-jointed antenna I, 4-jointed maxilliped, terminal joint as a lobe and a different number of setae on exopodite of antenna II and basipodite of leg V. *Tripartisoma* differs from the closely related genera *Cholidyella* and *Brescianiana* by the distinct separation of cephalothorax and metasome, presence of 1-jointed exopodite in the mandibular palp and of the 3 elements on internal arthrite of maxilla I, form of terminal joint of maxilliped and some other features. (Auth.)

B-30597

Hurst, J.L., Pugh, G.J.F., Walton, D.W.H., **Effect of temperature on the growth of *Candida saké* isolated from the leaves of a subantarctic grass,** *Microbial ecology,* 1984 10(2), p.89-93, 17 refs.

During a survey of microfungi on the subantarctic island of South Georgia, large numbers of phylloplane yeasts were isolated in late spring from leaves of a tussock grass. The dominant yeast was identified as *Candida saké,* this being the first record for the Antarctic region. Isolates in liquid culture had a temperature optimum for growth of 20-25 C. It was capable of assimilation of a range of simple carbohydrates, similar to those found in leachates from new leaves of the tussock grass. The seasonal decline of yeasts on the phylloplane is discussed in terms of the availability of leachate and the growth of filamentous microfungi on new leaves. (Auth.)

B-30598

Liakh, S.P., Kozlova, T.M., Salivonik, S.M., **Effect of periodic freezing and thawing of cells of the antarctic black yeast *Nadsoniella nigra* var. *heseulica*,** *Microbiology,* Jan. 1984 52(4), p.486-491, Translation of Mikrobiologiia 52(4):620-623, Jul.-Aug. 1983. 20 refs.

The response to periodic freezing (to -13 C) and thawing was studied as a factor of the natural habitat. After a single treatment cycle, viability was retained in 1/3 of the cells, and after 10 cycles in 1/10 of the cells. The nucleus was the most cryolabile structure. Damage included distension of the nucleus, widening of nuclear pores, separation of membranes of the nucleolemma, and its fragmentation. Swelling of mitochondria, greater translucency of the matrix, and loss of packing compactness of crystals were also noted. Defects were often multiple. Some of the cells did not exhibit ultrastructural changes. (Auth.)

B-30600

Marsh, K.V., Buddemeier, R.W., **Radionuclides in plankton from the South Pacific basin,** March 13, 1984, 9p., DE84 008943, CONF-849498-6, UCRL-89843, EDB-520302, Prepared for the International Conference on Nuclear Methods in Environmental and Energy Research, Mayaguez, Puerto Rico, April 2, 1984. 7 refs.

An investigation of the utility of marine plankton as bioconcentrating samplers of low-level marine radioactivity in the southern hemisphere is reported. A literature review has shown that both freshwater and marine plankton have trace element and radionuclide concentration factors (relative to water) of up to 10,000. Participation in Operations Deepfreeze 1981 and 1982, permitted collecting a total of 48 plankton samples from the USCGC *Glacier* on its antarctic cruises. Concentrations in plankton of the naturally-occurring radionuclides Be-7, K-40, and the U and Th series were measured, and low levels of Ce-144 and Nb-95 in seven samples ranging as far south as 68 deg were detected. Biological identification of the plankton suggests a possible correlation between radionuclide concentration and the protozoa content of the samples. (Auth.)

B-30604

Müller, D., **Sexual reproduction in algae** [Reproducción sexual de algas], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.19-20, In Spanish.

The methods of selection, inoculation and cultivation of live algae of the species *Phacurus* and *Himantothallus,* and their transportation from the South Shetland Islands to Germany for laboratory investigation of their reproductive processes, are described. Cultivation of the macroalgae did not produce satisfactory results, although a great number of inoculations resulted in numerous small algae considered to be macroalgal epiphytes. It is concluded that, to insure reproductive success, it is of primary importance that the initial selection of plants be conducted during their fertility period.

B-30606

Torres N., D., **Results and plans of chilean investigations of pinnipeds** [Resultados y proyecciones de las investigaciones chilenas sobre pinípedos], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.33-41, In Spanish. 21 refs.

Tabulated and discussed is a census identifying 5 different species of seals, carried out on 12 islands of South Shetlands group during the 1965-1966 season, showing a total 29,993 animals; on 8 islands, during 1972-1973, showing 30,047 animals; and on 8 islands, during November 1981, showing 6,335 animals. Census and marking of 970 seals on Livingston Island, from January 17 to 21, 1984, is also reported.

B-30607

Guzmán G., G., Xavier Filho, L., Pereira A., E.C., **Nutrient flow in antarctic tundra communities** [Flujo de nutrientes en comunidades de tundra antártica], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.42-44, In Spanish. 14 refs.

The availability of plant nutrients in the Antarctic is discussed, and a diagram showing the principal interactions between nutrients and terrestrial communities is presented. Also discussed is the principal source of nitrogen and phosphorus, bird droppings, and their transformation caused by bacterial activity.

B-30610

Sugii, K., Watanabe, T., Kinumaki, T., **Studies on the utilization of antarctic krill, *Euphausia superba* Dana. Pt.3,** *Tokai Regional Fisheries Research Laboratory, Tokyo. Bulletin,* Nov. 1982 No.108, p.31-37, In Japanese with English summary. 7 refs. For Parts 1 and 2 see 11B-22738 and 11B-22739.

Studies on chemical composition of krill caught in various areas over the approx. period Nov. 15-Feb. 26 in the 1975/76, 1976/77, 1977/78 and 1978/79 seasons are reported. Data are given for size of the krill, and for composition (protein, moisture, fat, ash, Cu, Ca) of frozen raw and frozen boiled krill. The size of krill was greatest in mid-season, and varied between years; no clear relation of size to chemical composition was observed. Proximate composition of raw krill was: moisture 73-83%, crude protein 13-18%, crude fat 1-7%, crude ash 2.5-3.4%. Corresponding values for boiled krill were 74-82%, 11-17%, 2-9% and 2.8-5.1% respectively. Crude fat content tended to increase towards the end of the season. Ca content was high in the carapace, relatively low in the cephalothorax, viscera and tail meat; differences in Cu content between body parts were rather small. (Auth. mod.)

B-30611

Sugii, K., Kinumaki, T., **Studies on the utilization of antarctic krill, *Euphausia superba* Dana. Pt.4,** *Tokai Regional Fisheries Research Laboratory, Tokyo. Bulletin,* Nov. 1982 No.108, p.39-46, In Japanese with English summary. 19 refs. For Parts 1, 2 and 3 see 11B-22738, 11B-22739 and B-30610.

Lipid characteristics of (i) raw and (ii) boiled krill samples caught over the 1975/76 to 1979/80 seasons are reported. Data are given for acid value, unsaponifiables contents, iodine value, and vitamin A, astaxanthin and vitamin E contents. Acid values were 25.2-90.2 and 10.0-33.2 respectively for (i) and (ii). These differences are discussed in relation to enzymic lipolysis in (i). Iodine values were 127.5-169.2 and 129.0-157.3 respectively in (i) and (ii) the difference being insignificant. Vitamin A content decreased from 115-511 IU/g oil in 1975/76 to 43-241 IU/g oil in 1977/78. Astaxanthin content varied from 0.3 to 2.7 mg/g oil. The ALPHA-tocopherol content ranged from 46 to 788 MY g/g oil, GAMMA-tocopherol content ranged from 0.6 to 5 MY g/g oil. Contents of tocopherols were slightly lower in (ii) than in (i). (Auth. mod.)

B-30612

Shibata, N., **Food biochemical study on utilization of muscular proteins in antarctic krill for human consumption,** *Tokai Regional Fisheries Research Laboratory, Tokyo. Bulletin,* Aug. 1983 No.111, p.63-141, In Japanese with English summary. 132 refs.

Extensive studies on food use of krill muscle protein are reported in detail. Aspects considered include: amount of myofibrillar protein in krill muscle; proteolysis of muscle proteins by krill tissue proteases; the relation between freshness of krill and extractability of its muscle protein; biochemical properties of protein extracted from fresh muscle; evaluation of molecular size of krill protein by gel filtration; changes in biochemical properties and molecular size of proteins from krill stored at low temp.; characteristics of heated kamaboko-type gels prepared from myofibrillar fragments; and process factors influencing characteristics of such gels.

B-30615

Karpenko, E.A., Giul'badamov, P.S., **Net filtering properties in krill fishing** [Fil'truiushchie svoĭstva setnogo polotna pri oblove krilia], *Rybnoe khoziaĭstvo,* Dec. 1983 No.12, p.52-56, In Russian.

The effectiveness of various types of trawls in krill fishing is evaluated. Variables such as depth, speed, surface covered, size of the trawl, and sifting properties are tabulated and analyzed. It is concluded that cable trawling is not practical.

B-30616

Ryzhova, Z.V., **Products from krill meat** [Produktsiia iz miasa krilia], *Rybnoe khoziaĭstvo,* Dec. 1983 No.12, p.65-66, In Russian.

New products are proposed from krill meat; they include salad from krill and sea cabbage, krill cheese, and krill meat with mayonnaise and mustard. Recipes, processing and sterilization procedures are specified for each product. Storage requirements are given for the finished products.

B-30617

Fain, A., Sömme, L., Block, W., ***Hyadesia maxima* sp. n. (Acari, Hyadesiidae) from South Georgia,** *Société royale belge d'entomologie. Bulletin et annales,* 1983 Vol.119, p.171-176, 5 refs.

Mites of the family hyadesiidae (Astigmata), which occur in great numbers in the inter-tidal zone of South Georgia, are described. Also listed are the morphological differences between the new species *Hyadesia maxima,* the largest of the family Hyadesiidae, and *H. travei* Fain, 1975, described from St. Paul Island and New-Amsterdam Island.

B-30619

Tanimura, A., Minoda, T., Fukuchi, M., Hoshiai, T., Ohtsuka, H., **Swarm of *Paralabidocera antarctica* (Calanoida, Copepoda) under sea ice near Syowa Station, Antarctica,** *Antarctic record,* Aug. 1984 No.82, p.12-19, In English with Japanese summary. 18 refs.

During the day on January 22 to 23, a swarm of *P. antarctica* appeared just beneath the undersurface of the fast ice. It was primarily composed of adults. *P. antarctica* seemed to have aggregated horizontally in an extremely narrow layer against the undersurface of the sea ice with density of roughly 20-60k ind./cu m. Swarming may be associated with reproduction because almost all adult females were carrying the spermatophores. *P. antarctica* was probably attracted to the undersurface brightness of the sea ice. At night, the swarm disappeared from the whole water column and the zooplankton composition differed from that during the day. It is assumed that the disappearance of the swarm was due to *P. antarctica's* entering the loose lower part of the fast ice. (Auth.)

B-30626

Kawamura, Y., Nishimura, K., Matoba, T., Yonezawa, D., **Effects of protease inhibitors on the autolysis and protease activities of antarctic krill,** *Agricultural and geological chemistry,* Apr. 1984 48(4), p.923-930, 17 refs.

Homogenates of whole bodies, and the cephalothorax and abdomen parts of frozen krill were equilibrated at 37C at pHs between 2 and 10 and allowed to stand for 16 hours, following which the increase in the TCA soluble fraction was monitored. 14C-Hemoglobin (14C-Hb) hydrolyzing activity was also measured using each homogenate as a crude enzyme preparation. The degree of autolysis and the 14C-Hb hydroloyzing activity were maximum at pH 5-8 for the parts studied. The hydrolytic activity was highest in the cephalothorax, followed by that in the whole body and then the abdomen. It was seen that soybean trypsin inhibitor (STI), diisopropyl fluorophosphate (DFP) and leupeptin significantly inhibited hydrolyzing activity at neutral pH, and pepstatin, monoiodoacetic acid (IAAcid) and leupeptin were effective at acidic pH for all the parts. Autolysis of the cephalothorax and whole body at pH 7 was suppressed a little by STI and autolysis of the abdomen and whole body at pH 4 was significantly inhibited by iodoacetamide (IAA) and leupeptin. (Auth. mod.)

B-30627

Bate, G.C., Smith, V.R., **Photosynthesis and respiration in the sub-antarctic tussock grass *Poa cookii*,** *New phytologist,* Dec. 1983 95(4), p.533-543, 22 refs.

DLC QK1.N45

In common with other sub-Antarctic *Poa* species *Poa cookii* is highly productive. Infrared gas analysis studies at Marion Island showed that it is a C3 photosynthetic type plant, possessing a high CO2 compensation concentration and apparently high rates of photorespiration. However, photosynthetic light saturation was not attained at a photosynthetic photon flux density (PPFD) of 2000 micromol/m/s, possibly due to leaf anatomical features causing shading of the chlorophyllous mesophyll. Compensating irradiance values were 5 to 11 micromol/m/s. Net photosynthesis occurred below 0C and increased with temperature up to 10 to 12C, remaining constant up to 19 to 23C, depending in PPFD. Dark respiration increased exponentially with temperature and at 32C the temperature optimum had not been reached. Photorespiration also increased with temperature but rates were lower than those of dark respiration. Increasing the wind velocity over a leaf immediately decreased the net assimilation rate, which then slowly recovered to almost the original level. It appears that the grass is well-adapted to sub-antarctic conditions of low light, low temperatures and high wind. (Auth.)

B-30628

Jörgensen, P.M., Galloway, D.J., **New subantarctic species of the lichen genus *Peltularia*,** *Lichenologist,* 1984 16(2), p.189-196, 13 refs.

DLC QK580.7.L53

Peltularia crassa P.M. Jörg. & D. Galloway, a new, umbilicate lichen in the family Coccocarpiaceae is described from Campbell Island south of New Zealand. It occurs also on Macquarie Island. Its taxonomic and phytogeographical relationships are discussed. (Auth.)

B-30650

Bogdanov, A.S., Liubimova, T.G., **Study of the biological resources of the southern ocean,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.287-302, TT 79-52012, For Russian original see 10B-21706. 52 refs.

By focusing on basic research done by the Soviet Antarctic Expedition, by using *Discovery* reports and by analyzing materials of regional fishery research groups, the authors identify the high productivity areas in the southern ocean and the basic reasons for bio-productivity of many of them. It is well established that the prime consideration in southern ocean productivity is the Antarctic Circumpolar Current, which exerts a complex influence on distribution of biogenic elements, ocean features, phytoplankton and marine organisms. Involved study of marine biocenoses has revealed fundamental characteristics of distribution, population dynamics, and biology of many species and groups of fauna. The feasibility of harvesting antarctic resources, especially krill, is discussed. (Auth. mod.)

B-30654

Borisov, V.I., **Comparative analysis of electrophoretic spectra of proteins in antarctic whales. 3. Haptoglobins of little piked whales and sei whales** [Sravnitel'nyĭ analiz elektroforeticheskikh spektrov belkov kitov Antarktiki. 3. Gaptoglobiny malykh polosatikov i seĭvalov], *Zoologicheskiĭ zhurnal,* Sept. 1981 60(9), p.1406-1410, In Russian with English summary. 10 refs. For parts 1 and 2 see 12B-25468 and 25469.

DLC QL1.Z747

Two fractions stained intensively by benzidine with the mobility of 0.5 and 0.64 relative to Hb of the same species were found in the electrophoretic spectra of haptoglobins. All plasma samples under study belonged to one of 3 types according to the presence of slow, rapid, or both fractions of haptoglobins on the electrophoregrams. An analysis of distribution of frequencies of these phenotypes was carried out in individual samples of whales from the regions of fishing examined. The beginning of synthesis of haptoglobins appears to coincide with the end of embryogenesis in the species under study. (Auth.)

B-30657

Schenker, R., **Effects of temperature acclimation on cold-hardiness of antarctic micro-arthropods,** *Revue d'écologie et biologie du sol,* 1984 21(2), p.205-220, With French and German summaries. 21 refs.

Cold-hardiness of six species of micro-arthropods (one species of an oribatid, a mesostigmatid and a prostigmatid mite, and three species of Collembola) at Signy Island was tested after low temperature acclimation. Two types of acclimation were used, an 18 day acclimation to temperatures in the range 10 to -10 C in 5 deg steps, and a stepwise acclimation from 5 to -20 C with one week at each 5 deg step. After acclimation, cold-hardiness parameters such as individual supercooling points, cryoprotectant levels together with chillcoma and reactivation temperatures were measured. The patterns in the changes and limits of these parameters after acclimation differed significantly between species and type of acclimation. Such differences between species originating from living in a variety of terrestrial micro-habitats within a similar polar environment, suggest that the adaptive strategies developed by these micro-arthropods are a function of their micro-environments. (Auth.)

B-30658

Morris, D.J., North, A.W., **Oxygen consumption of five species of fish from South Georgia,** *Journal of experimental marine biology and ecology,* 1984 Vol.78, p.75-86, 33 refs.

The oxygen consumption rates of five species of subantarctic fish have been measured with particular emphasis on the previously unstudied early stages of the life history. The time courses for acclimation to the experimental apparatus show an initial elevation and increased variability of oxygen consumption followed by a decrease to a plateau within 12-14 h. Data on the relationship between size of fish and size of experimental chamber show the effects of these variables on acclimation, if the ratio of fish volume to chamber volume is <4%. Oxygen consumption rates are compared with published data and related to observations on the ecological niches and changes in morphology of the different stages of the various species. Intra-specific changes in the ecology of the various developmental stages are not reflected by discontinuities in the relationship between oxygen uptake and weight. Inter-specific differences in metabolic rate do, however, show a correlation with the activity level of species. (Auth.)

B-30659

Ricketts, C., Prince, P.A., **Estimation by use of field weighings of metabolic rate and food conversion efficiency in albatross chicks,** *Auk,* Oct. 1984 101(4), p.790-795, 5 refs.

A knowledge of the assimilation of food and of the energetic demands of chicks at different stages in the growth period can provide a basis for understanding growth strategies of seabirds. We have developed a simple model of chick weight loss between feeds that allows an estimation of metabolic costs and food-conversion efficiency in albatross chicks. The data required to provide these estimates are a series of frequent weights of a chick following a meal and the weight of food-conversion efficiency, which may reflect variation in the composition of meals delivered to chicks, and in the metabolic demands of individual chicks. (Auth.)

B-30661

West, C.C., **Micro-arthropod and plant species associations in two subantarctic terrestrial communities,** *Oikos,* 1984 42(1), p.66-73, With Russian summary. 11 refs.

Numbers of micro-arthropods recovered from adjacent localities within two terrestrial communities on South Georgia were found to be highly variable. This study attempts to relate some of this variation to the vegetation under which the micro-arthropods were found. Three multivariate techniques were used to suggest relationships between species in two communities, a grassland and a mossbank. On the grassland, there is an association of Acari based on the *Festuca contracta* tussocks, and another of Collembola based on *Chorisodontium aciphyllum* in the space between tussocks, while one species of mite is associated with a rush. The *Polytrichum alpestre* forming the mossbank may be modified either by *C. aciphyllum,* which provides more space for micro-arthropods, or by a rush which supports an association similar to that found in the *F. contracta* tussocks. Pure *P. alpestre* has surface and deeper living faunas, separated by a layer of tomentous rhizoids which excludes all but the smallest of mites. (Auth.)

B-30662

Prince, P.A., Francis, M.D., **Activity budgets of foraging Gray-headed Albatrosses,** *Condor,* Aug. 1984 86(3), p.297-300, 18 refs.

Activity recorders were attached to 13 Gray-headed Albatrosses *(Diomedea chrysostoma)* rearing chicks at South Georgia in February 1982. During foraging trips to sea totalling 284 bird-days, an average of 74% of the time was spent flying, and 15% of the day and 50% of the night were spent on the sea. The extensive nocturnal activity on the water strongly supports suggestions that the species feeds mainly at night. Using activity budget data with field data on foraging trip length and flight speeds and patterns, maximum foraging range is estimated to be 500-800 km. (Auth.)

B-30663

Jacques, G., Fiala, M., Oriol, L., **Bioassay demonstration that the effect of trace elements on the growth of antarctic phytoplankton is negligible** [Démonstration, à partir de tests biologiques, de l'effet négligeable des éléments traces sur la croissance du phytoplancton antarctique], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 3,* May 14, 1984 298(18), p.527-530, In French with English summary. 11 refs.

Enrichment experiments have been carried out to investigate the hypothesis of a limiting effect of trace elements (vitamins and metals) on the primary production and phytoplankton growth of the offshore antarctic waters. The results show that vitamins and metals do not control phytoplankton growth but provide indirect evidence of the major importance of turbulence as a limiting factor. (Auth.)

B-30669

Pickard, J., Seppelt, R.D., **Phytogeography of Antarctica,** *Journal of biogeography,* Mar. 1984 11(2), p.83-102, 48 refs.

Existing schemes of phytogeographic subdivision of Antarctica and adjacent ocean are reviewed. Russian studies which commenced in the 1950s are reviewed for the first time in the Western literature. Records of lichen and moss occurrence from seventy-five scattered locations in the Australian Antarctic Territory, eastern Antarctica, are analyzed for phytogeographic patterns. Using a polythetic agglomerative classification the localities form seven groups: large coastal outcrops of ice-free rock, Mawson Coast, Framnes Mountains, peninsulas near Casey Station, Windmill Islands, Prince Charles Mountains and floristically rich islands. The thirty-six species of lichens and five species of mosses form five groups, each with a characteristic ecological pattern. The species-groups correspond reasonably well with communities described from elsewhere in Antarctica. (Auth. mod.)

B-30670

Procter, D.L.C., **Towards a biogeography of free-living soil nematodes. 1. Changing species richness, diversity and densities with changing latitude,** *Journal of biogeography,* Mar. 1984 11(2), p.103-117, Refs. p. 114-117.

DLC QH84.J68

Existing knowledge on the global distribution of soil nematodes is reviewed. The species richness, densities and biomass of free-living soil nematodes are often higher at high latitudes than at lower latitudes. The diverse and abundant micro-organisms at high latitudes support many nematodes, although adaptability and lack of competitors also contribute to nematode importance. Nematodes contribute little to tropical soil invertebrate faunas. They are most diverse and abundant in temperate regions, where they experience partial ecological release due to the absence of tropical competitors. Antarctic nematode fauna has fewer species and lower densities than that of the Arctic. This is because the Antarctic offers fewer opportunities for dispersal, and has a harsher climate, which limit the flora and fauna. Increasing altitude resembles increasing latitude in its effect on nematode distribution and abundance. (Auth. mod.)

B-30673

Dearborn, J.H., Edwards, K.C., Fratt, D.B., Zamer, W.E., **Echinoderm studies along the Antarctic Peninsula,** *Antarctic journal of the United States,* 1983 18(5), p.193-194.

Studies to clarify the trophic position of selected asteroids and ophiuroids (sea stars and brittle stars) within the antarctic marine ecosystem are discussed. The approaches used have included analyses of stomach contents, observation of feeding behaviors under laboratory conditions, and scanning electron microscope (SEM) studies of the morphology of feeding structures. Underwater photography was used to observe asterozoans under natural conditions. Emphasis was placed on the collection of several species not previously found in sufficient numbers for reliable diet analysis; oxygen uptake and ammonia excretion rates were determined on *Granaster nutrix* in the Palmer Station laboratory. In addition oxygen-to-nitrogen ratios were calculated and data was obtained on the proximate biochemical composition and ash content for this unusual asteroid.

B-30674

Shulenberger, E., **Superswarms of antarctic krill *(Euphausia superba* Dana),** *Antarctic journal of the United States,* 1983 18(5), p.194-197, 3 refs.

A massive krill swarm observed near Elephant Island just off the tip of the Palmer Peninsula is described. The swarm was initially located due to the presence of a very large Soviet trawler fleet (more than 40 trawlers) which was harvesting the krill. The patch was several kilometers wide in both horizontal dimensions, up to several hundreds of meters thick, performed no diurnal vertical migration, and had no surface manifestation. Acoustic estimates gave a total krill biomass for the superswarm of about 2-10 million tons; up to 10,000 animals per cu m. In addition to euphausiids the swarm included salko, amphipods, and phytoplankton. Adult euphausiids of various species co-occur within the swarm on all spatial scales examined. Differences in larval and adult abundances are discussed. Many of the questions regarding krill for which answers will be sought on the next cruise are outlined.

B-30675

Macaulay, M., **Antarctic krill *(Euphausia superba)* swarms from Elephant Island,** *Antarctic journal of the United States,* 1983 18(5), p.197-198, 2 refs.

Observation methods and systems used to investigate open-sea patches of krill during the second survey of the Scotia Sea aboard R/V *Melville* are described. The variance associated with biomass estimates was computed by two independent methods. The first used serial correlation; the second used the cluster sampling estimator method of Williamson (1982) as an independent method for comparison. During the survey, numerous patches and large concentrations of krill were found. The average size patch was 100 to 500 m in horizontal extent by 40 to 60 m in vertical extent with mean abundance of 50 to 200 g per cu m (approx. 75 to 300 individuals per cu m). The very large swarm found northwest of Elephant Island contained abundances up to 600 to 800 g per cu m, but typically abundance was 300 to 500 g per cu m.

B-30676

Wormuth, J.H., **Zooplankton associated with superswarms of antarctic krill,** *Antarctic journal of the United States,* 1983 18(5), p.199-200, 4 refs.

Using a multiple opening-closing net and environmental sensing system (MOCNESS) which collected eight discrete samples per tow, 25 tows were taken in and around a large krill swarm in the vicinity of Elephant Island. Taxonomic analysis of all 200 samples has been completed. With few exceptions, copepods dominated the samples numerically. The copepods consisted mainly of five species (*Calanus propinquus, Calanoides acutus, Metridia gerlachei, Rhincalanus gigas,* and *Euchaeta antarctica).* The rank order of numerical abundance of these five species was very consistent regardless of depth, time of day, or horizontal distance. These five species also show a significant tendency to covary in numerical abundance in the same tows. This suggests that these copepod species are responding to the same environmental stimuli.

B-30677

Quetin, L.B., Ross, R.M., **Larval growth and hatching under pressure of eggs of *Euphausia superba*,** *Antarctic journal of the United States,* 1983 18(5), p.200-202, 5 refs.

Eggs and larvae of *Euphausia superba* were cultured at 1.0-0.3 C at Palmer Station, Antarctica. Wet weight increased by about five times from egg (about 112 microg) to calyptopis 3 (about 503 microg). Large weight gains occurred during metamorphosis from metanauplius to calyptopis 1. calyptopis 1 to 2, and calyptopis 2 to 3. These gains are probably due to the uptake of water during molting and agree with our observation that early larvae do not molt until they change from metanauplius to calyptopis 1. Preliminary experiments on the effects of hydrostatic pressure on eggs suggest that increasing hydrostatic pressure as experienced by krill eggs as they sink during development has little or no effect on hatching time.

B-30678

George, R.Y., **Field and laboratory studies on the antarctic krill *Euphausia superba* in austral summer 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.202-203, 6 refs.

During the months of Jan., Feb., and Mar. 1983 gravid females of the antarctic krill *Euphausia superba* were captured from Charlotte Bay in the Antarctic Peninsula. However, the samples were mainly dominated by juveniles, and mature krill were less than 7% of the samples. Embryos developing from the laboratory-spawned eggs were studied from the first segmentation of the eggs through the various stages of blastula and gastrulation to advanced limb-bud stage close to hatching. The progression of egg development was investigated at 1 atm and at increasing hydrostatic pressure simulating the actual sinking rate of krill eggs. The results of the measurements are described.

B-30679

Van Vleet, E.S., **Lipid biochemistry of antarctic midwater organisms,** *Antarctic journal of the United States,* 1983 18(5), p.204-205, 8 refs.

The lipid biochemistry of samples collected from several trophic levels of the Antarctic midwater food web are being investigated. Wax esters and triacyglycerols are being used to investigate the extent of fat storage for insulation, primary metabolic energy reserve units, and the extent to which lipids may influence the buoyancy of individual organisms. By examining both the stereochemistry and concentration ratios of three isoprenoid fatty acids (4,8,12 trimethyltridecanoic, pristanic, and phytanic acids), both feeding relationships between adjacent members of the Antractic food chains and energy catabolism within organisms are being determined.

B-30680

DeVries, A.L., Moody, E.J., **Role of glycoprotein antifreezes in freezing avoidance of antarctic fish,** *Antarctic journal of the United States,* 1983 18(5), p.205-206, 8 refs.

From Oct. through Dec. more than 300 specimens of *Dissostichus mawsoni* fish weighing a total of nearly 15 tons were caught at stations located 5 km west of McMurdo Station. Investigations of the turnover rate of antifreeze molecules in small specimens of healthy, feeding *D. mawsoni* confirmed previous interpretations that turnover rates are slow and are greatly dependent upon the nutritional states of the fish. Investigations of the role of antifreeze in the bile and intestinal fluid of several McMurdo Sound species suggest that antifreeze is transported from the blood to the bile where it then flows into the intestinal fluid, and that the intestinal fluid antifreeze is excreted with the feces. These results are the first clear evidence that the low molecular-weight antifreeze molecules have a specific function in contrast to the proposed cooperative function put forward by Osuga et al (1978). The distribution of antifreezes into the special fluid compartments of the central nervous system was also investigated. Finally, the structure and function of the glycopeptide antifreezes of northern arctic cods were compared with those of the antarctic nototheniids.

B-30681

Hoberg, E.P., **Preliminary comments on parasitological collections from seabirds at Palmer Station, Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.206-208, 6 refs.

An objective of this investigation was to characterize the helminth fauna of a diverse assemblage of seabirds breeding at a specific geographic locality and to attempt to determine factors influencing its ecological and zoogeographic relationships. Of primary interest was the degree to which differences in helminth faunas were reflected by dissimilar trophic relations of seabirds comprising four generalized feeding guilds. The species of birds included were: (1) zooplanktivores (Adélie penguin, chinstrap penguin, gentoo penguin, southern fulmar, cape pigeon, snow petrel, Wilson's storm petrel, and south polar skua); (2) piscivores (blue-eyed shag, and antarctic tern); (3) intertidal foragers and scavengers (American sheathbill, and southern black-backed gull); (4) scavengers and predators of other birds (southern giant fulmar and brown skua).

B-30682

Osuga, D.T., Feeney, R.E., Yeh, Y., **Properties of antifreeze proteins from fish blood and penguin egg-white proteins,** *Antarctic journal of the United States,* 1983 18(5), p.208-209, 4 refs.

A two-man team, Michael Knauf and Yin Yeh, completed one month (Nov., 1982) at McMurdo, Antarctica, for the acquisition of fish blood serum from *Pagothenia borchgrevinki* and *Dissostichus mawsoni.* Crude preparations of antifreeze glycoproteins have been separated from the serums, and final purification is underway. Studies were completed and published on the two major proteins of penguin egg white. A newly discovered protein was named *penalbumin.* Penalbumin and the penguin ovalbumin exist in approximately equal amounts and both have comparatively reactive sulfhydryl systems. Penalbumin is present in both the emperor *(Aptenodytes forsteri)* and the Adélie *(Pygoscelis adeliae),* but it is absent from most other avian egg whites.

B-30683

Trivelpiece, W.Z., Trivelpiece, S.G., Volkman, N.J., Ware, S.H., **Breeding and feeding ecologies of pygoscelid penguins,** *Antarctic journal of the United States,* 1983 18(5), p.209-210, 3 refs.

Studies of the breeding and feeding ecologies of the sympatric populations of pygoscelid penguins at Point Thomas, King George I. are summarized. During 1982-83, unlike two previous seasons (1977-78 and 1981-82), the 3 pygoscelid penguin species had very different reproductive success rates. Adélie and chinstrap penguins fledged fewer chicks in 1982-83 than in previous years, while gentoo penguins had a higher success rate. Adélie and chinstrap penguins fasted for 2-3 weeks between arrival and egg laying. Following clutch completion, the male Adélie assumed the first incubation shift and fasted another 10-19 days; the female went to sea to feed. In chinstraps, either the male or female took the first incubation shift of approximately 7 days. Unlike its congeners, gentoo penguin pairs feed daily early in courtship and relieve each other at the nest about every 24 hours throughout incubation. Adélie and chinstrap penguins ate 99% krill and gentoo penguins ate 84% krill and 16% fish. Also Adélie penguins feed further offshore than do either of its congeners. Differences occurred in the diets of male and female gentoo penguins, and the gentoo was the most sexually dimorphic species.

B-30684

Sickles, S.A., Murrish, D.E., **Effect of lighting conditions on circadian rhythmicity in the body temperature of Adélie penguins,** *Antarctic journal of the United States,* 1983 18(5), p.210-211, 5 refs.

The core (body) temperature of free-ranging and captive Adélie penguins was monitored by radio telemetry in Dec. 1982. The birds were maintained in the natural photoperiod of continuous light (LL) for 4 days. Body temperature data were analyzed using period-and-phase analysis on a microcomputer. Analysis indicated that in the natural photoperiod, the body temperatures of both penned birds and birds in the field were arrhythmic. The birds were placed on LD cycle following the LL exposure. Body temperatures were considerably higher during the day and lower during the night as is typical of diurnal homeotherms. There was also an anticipatory increase in body temperature shortly before lights on suggesting that the rhythm is endogenous in nature. The body temperature rhythm of one bird persisted in 2 days of constant dark following the LD portion of the study, also demonstrating the endogenous nature of the rhythm, and that an LD 16:8 cycle is an effective synchronizer of body temperature.

B-30685

Bengtson, J.L., Schneider, D.J., **Fur seal research at Bird Island, South Georgia,** *Antarctic journal of the United States,* 1983 18(5), p.212, 5 refs.

This season's fur seal research at Bird I. was organized into three subprojects: 1) studying the relationship between female behavior and fine tooth structure, 2) monitoring female behavior at sea, and 3) examining specimen material. The feeding/suckling behavior of 28 females and their pups was monitored from pupping through near-weaning to provide a sample of seals with a known behavioral history. Injections of oxy-tetracycline were administered to females and pups periodically during the lactation period. Tetracycline is incorporated into new tooth tissue and fluoresces when examined under ultraviolet light, thereby providing a benchmark of which layers were being laid down when. Movements of females at sea were monitored by triangulating their location from two small tracking stations on Bird I. mountain peaks. Reproductive tracts and teeth were collected from sacrificed animals. Observations support the assumption that females ovulate just before going to sea for their first feeding trip after pupping.

B-30686

Hill, R.D., Schneider, R.C., Schuette, A.H., Zapol, W.M., Liggins, G.C., Hochachka, P.W., **Microprocessor-controlled monitoring of bradycardia in free-diving Weddell seals,** *Antarctic journal of the United States,* 1983 18(5), p.213-214, 3 refs.

Experiments with a microprocessor-controlled monitor designed to attach to freely diving Weddell seals to measure and store records of their average heart rates and seawater depth every 30 sec are described. The design parameters and operation are outlined. At the field site two holes, 10 m apart, were drilled through the annual ice on McMurdo Sound. A fish hut, acting as a field laboratory, with a hole in its floor was placed over one of the holes, and the other hole was blocked so that the seal would be obliged to surface in the field laboratory between dives. The laboratory contained a minicomputer to which heart rate and depth data were transmitted via a fiber-optic lead. The longest dive recorded was 52 min and the deepest, 486 m.

B-30687

Testa, J.W., Braun, S., Siniff, D.B., Reichle, R., Ferm, L., Winter, J.D., **Ecology of Weddell seals in McMurdo Sound 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.214-215, 5 refs.

Research on McMurdo Sound's Weddell seal population continued in three main areas during the 1982-1983 field season. (1) Tagging and census work provided the long-term focus for population dynamics research at McMurdo Sound. (2) A study was made of concurrent distribution of seals and a conspicuous prey species, the antarctic cod *(Dissostichus mawsoni),* which may be an important food source to breeding adults during the nonbreeding season. (3) The distribution and behavior of juvenile seals (less than 5 years old) were studied to understand age-class interactions and their effects on population dynamics.

B-30688

Komarkova, V., **Plant communities of the Antarctic Peninsula near Palmer Station,** *Antarctic journal of the United States,* 1983 18(5), p.216-218, 9 refs.

Investigations were conducted on the diversity of plant communities, their controlling factors and recovery after disturbances including human, in various ice-free areas along the Antarctic Peninsula, particularly near Palmer Station. 571 plots were sampled at 14 sites; many plots were marked permanently. The plots were sampled for a number of vegetation and environmental variables including disturbance. Climate measurements were also made. Colonization of newly available areas, recovery after human and other disturbance, and dynamics of mature communities are very slow. Experiments in competition, recovery and environment manipulation were initiated on Gamage Point.

B-30689

Ford, A.B., **Skua and petrel sightings in interior antarctic ranges—Thiel and southern Pensacola Mountains,** *Antarctic journal of the United States,* 1983 18(5), p.218-220, 10 refs.

Skuas and petrels have been sighted on rare occasions by U.S. geological Survey field parties in some of the mountain ranges nearest the South Pole, including the Thiel Mountains and the Patuxent Range and Pecora Escarpment of the southernmost Pensacola Mountains. A skua visiting the Thiel Mountains in early January 1961 may have been following vehicle tracks of a tractor traverse from Byrd to Pole Station. A snow petrel observed near Pecora escarpment (lat. 85 deg 30'S) may be the southernmost sighting of this species.

B-30690

Parker, B.C., Mikell, A.T., Simmons, G.M., Jr., **Strategies for growth and survival of antarctic oasis lake biota,** *Antarctic journal of the United States,* 1983 18(5), p.220-221, 16 refs.

Studies of the adaptations of antarctic lake biota to low light, low temperature, and high dissolved O2 are reported, and new evidence is presented for phosphorus limitation and stromatolite structure, distribution, and lipid content. The studies have produced the first estimate of the photosynthetic quantum efficiency for a phytoplankton community in high latitude polar ecosystems, namely for Lakes Bonney, Fryxell, Hoare and Vanda. Algal taxa growth was better adapted to colder temperatures and was frequently inhibited by warmer temperatures. High dissolved O2 severely inhibited the growth and metabolism of planktonic bacteria and phosphorus was found to be a major limiting nutrient for plankton growth and productivity. The distributions of the various stromatolite types in antarctic lakes are outlined. They include columnar liftoff, aerobic prostrate, anaerobic prostrate, and pinnacle mats. Examination of the lipids extracted from select stromatolites indicates that the major groups of microorganisms occurring in the stromatolitic mats (diatoms, bluegreen algae and bacteria, yeasts) reflect the lipid composition.

B-30691

Miller, K.J., Leschine, S.B., Huguenin, R.L., **Halotolerance of micro-organisms isolated from saline antarctic dry valley soils,** *Antarctic journal of the United States,* 1983 18(5), p.222-223, 13 refs.

Investigations of halotolerance as a function of temperature in strains of bacteria isolated from saline dry valley antarctic soil samples are summarized. The soil samples were collected from a variety of locations within Wright and Taylor Valleys. Enrichment and isolation procedures are described. The isolate chosen for study (strain A4a) was an orange-pigmented, gram-positive, obligately aerobic coccus. Strain A4a was capable of growth over wide ranges of temperature (0-40C) and NaCl concentrations (0-2.0M). The optimal growth temperature was found to be approximately 25 C at all concentrations of NaCl examined. Growth rate decreased with increasing concentrations of NaCl at all temperatures, and strain A4a grew in media not supplemented with NaCl. Growth in media containing high concentrations of NaCl was therefore the result of halotolerance, and a specific NaCl requirement was not detected in these studies. To further characterize strain A4a, the guanine plus cytosine content of the DNA and phospholipid composition were determined. This is believed to be the first report of a species of *Planococcus* isolated from dry valley soils.

B-30693

McKay, C.P., Weed, R., Tyler, D.A., Friedmann, E.I., Vestal, J.R., **Studies of cryptoendolithic microbial communities in the Antarctic cold desert,** *Antarctic journal of the United States,* 1983 18(5), p.227-228, 4 refs.

Studies are reported on lichen growth variation in microbial biomass, the microenvironment inside rock substrate, seasonal changes in temperature and light, weathering processes, and weathering rates. Viable microorganisms were found throughout the rocks and variation in biomass occurred within each rock and among the various rocks. Continuous monitoring of the microenvironment in colonized rocks was accomplished with an ARGOS Data Acquisition Platform (ADAP), which is described. The long residence time of snow accumulations and the holding capacity of the rocks suggest that the effects of a wet season could last for more than 1 year. The growth of the microorganisms in rocks on the terrace may be significantly greater during the wet years.

B-30710

Walker, G.E., Ling, J.K., **New Zealand sea lion *Phocarctos hookeri* (Gray, 1844),** Handbook of marine mammals. Vol.1. Edited by S.H. Ridgway and R.J. Harrison, London, Academic Press, 1981, p.25-38, Refs. p.36-38.

The external characteristics and morphology of New Zealand sea lion *Phocarctos hookeri* are described, as well as its internal organs, its behavior, reproduction, and parasites. Distribution and migration patterns presented extend from Auckland Islands, where the major breeding colonies are found, to as far as Macquarie Island, reached often by lone stragglers.

B-30711

Vaz-Ferreira, R., **South American sea lion *Otaria flavescens* (Shaw, 1800),** Handbook of marine mammals. Vol.1. Edited by S.H. Ridgway and R.J. Harrison, London, Academic Press, 1981, p.39-65, Refs. p.61-65.

The scientific and common names of the single recognized species of the genus *Otaria* Perón, 1816, family Otariidae, are reviewed, and its external and internal anatomical characteristics are described. A summary of *Otaria* distribution, covering an area from Rio de Janeiro to the Falkland Islands, is presented. The seal's feeding habits, predation, population, behavior, and reproduction are discussed in detail.

B-30712

Palma, R.L., Pilgrim, R.L.C., **Genus *Bedfordiella* (Mallophaga: Philopteridae) and a note on the lice from the Kerguelen Petrel *(Pterodroma brevirostris)***, *National Museum of New Zealand. Records,* Aug. 19, 1983 2(13), p.145-150, 15 refs.

The history of *Bedfordiella* is outlined. Examination of 22 lice samples from *P. brevirostris* (type host of *B. unica)* containing many specimens belonging to *Bedfordiella,* shows that only 1 species should be recognized, *B. unica* Thompson, 1937. *B. simsi* Timmermann, 1961 is placed as a junior synonym and its type host, *Pachyptilla vittata vittata,* is regarded as a wrong host for lice of *Bedfordiella.* The relationships of the Kerguelen petrel based on its mallophagan parasites are discussed. (Auth.)

B-30713

Usher, M.B., Booth, R.G., **Arthropod communities in a maritime antarctic moss-turf habitat: three-dimensional distribution of mites and collembola,** *Journal of animal ecology,* June 1984 53(2), p.427-441, 29 refs.

Five sets of 96 contiguous samples were cut from a moss-turf habitat on Signy Island in the maritime Antarctic. Ten taxa of arthropods (Acari and Collembola) were extracted, and 6 occurred frequently enough for analysis. The vertical distribution of these 6 taxa indicates that 3 occur near the surface of the moss-turf, 2 in an intermediate position and 1 deep down. Within a taxon the vertical distribution varies from one developmental stage to another. The predator, *Gamasellus racovitzai,* is generally randomly distributed. Since species differ in their vertical distributions, many correlation coefficients between the counts of individuals for species pairs are negative. Two separate subcommunities of arthropods can be recognized: these are termed the green moss community and the dead moss community. The former occurs near the surface of the moss-turf (0-1.5 cm layer), the latter deeper in the turf (below 3 cm). The numbers of individuals of a species in one community are generally not correlated with the numbers of the same species in the other community and, hence, aggregations in the 2 communities are independent of each other. (Auth. mod.)

B-30714

Sömme, L., Block, W., **Ecophysiology of two intertidal mites at South Georgia,** *Oikos,* 1984 42(3), p.276-282, With Russian summary. 13 refs.

The resistance of *Halozetes marinus* (Cryptostigmata) and *Hyadesia maxima* (Astigmata) to cold and heat, to submergence in water and to anoxia was studied to determine their adaptations to the intertidal environment of the sub-Antarctic. Supercooling capacities to lower than -20C exist in both species, and they remain unchanged during acclimation at temperatures around 0 C for up to 46 days. More than 77% of all samples were low group individuals. Glycerol and myoinositol were found in maximum concentrations of about 10-20 microg/mg live weight, which together with four other polyols and sugars did not influence supercooling. The probability of inoculative freezing increased with lowered temperature and increased time at subzero temperatures, with higher mortality in freshwater than in seawater. Tolerance to heat (35 C) was greatest in moist rather than dry conditions, and losses of 25-30% body weight resulted in about 50% mortality in both mites. Mortality during submersion in freshwater was greater than in seawater, suggesting that normal tidal submersion has no effect. Both species also survived 16 days under anoxia. These mites are well adapted to the South Georgian intertidal environment in respect of the ecophysiological features examined, and inoculative freezing may be the main mortality factor during severe winters. (Auth.)

B-30716

Kock, K.-H., Schneppenheim, R., Siegel, V., **Contribution to the fish fauna of Weddell Sea,** *Archiv für Fischereiwissenschaft,* 1983 34(2-3), p.103-120, With German summary. 39 refs.

During the austral summers of 1979/1980 and 1980/1981 35 fish species belonging to 8 families were collected in the Weddell Sea. By far the most abundant were *Trematomus eulepidotus* (Nototheniidae) and *Prionodraco evansii* (Bathydraconidae). The range of distribution of 10 species which was previously recorded only either from Greater Antarctica or Lesser Antarctica can now be extended to a circumantarctic range of distribution. The developmental stage of the gonads in *T. eulepidotus, P. evansii, Cygnodraco mawsoni* and *Gerlachea australis* indicates that all species are autumn/early winter spawners. The most common parasites were *Elytrophalloides oatesi* (Trematoda), *Eubrachiella antarctica* (Copepoda) and *Contracaecum sp.* larvae (Nematoda). Infestation rates in *P. evansii* and *T. eulepidotus* with *E. antarctica* and *E. oatesi,* respectively, were positively correlated with the length of the fish. Stomach contents analysis in 5 species shows a gross partitioning of the food resources along a vertical distribution axis: *T. scotti* and *P. evansii* primarily preyed upon benthic Polychaeta and Gammaridea. *C. mawsoni* is also a bottom feeder, but probably preys on larger and more motile organisms. *T. eulepidotus* exploited both benthic and pelagic habitats; *G. australis* exclusively fed on pelagic food items like Hyperiidae and Euphausiidae. (Auth.)

B-30717

Klindt, H., Zwack, F., **Method for acoustic estimation of krill *Euphausia superba* abundance applied to FIBEX data,** *Archiv für Fischereiwissenschaft,* 1984 34(2-3), p.121-144, With German summary. 13 refs.

A computer-controlled echo-integration system, to assess the distribution and total biomass of the Antarctic krill, was developed at the Institut fuer Fangtechnik, Hamburg, in 1978, and approved during FIBEX. The received data were evaluated according to standardized methods. The results were presented at the Post FIBEX Data Interpretation Workshop (Sept./Oct., 1981 in Hamburg). The method and its prerequisites permitting a successful application are described. Systematic and random errors are discussed by means of exemplary selected density and swarm size distributions. (Auth. mod.)

B-30718

Haschemeyer, A.E.V., Persell, R., **Comparative analysis of leucine transport in temperate fish liver *in vivo*,** *Comparative biochemistry and physiology,* 1984 78A(2), p.381-385, 20 refs.

The uptake of [14C]leucine in toadfish *(Opsanus tau)* liver *in vivo* at 10 deg C has been studied by a single pulse injection technique. Transport parameters were determined on the basis of the distribution of the amino acid and of [3H]inulin, used as a marker for extracellular space, in liver free and protein-bound fractions and in venous blood draining from the liver. Three transport systems in this species are discussed: 20-20, operating in 20 deg C-acclimated fish at 20 deg C; 20-10, in 20 deg C-acclimated fish at 10 deg C; and 10-10 in 10 deg C-acclimated fish at 10 deg C. The properties of these systems are compared with the 0-0 system of antarctic fish and with transport systems of mammalian cells. The latter are similar to our non-acclimated system, 20-20, suggesting that the mammalian cell may not be at a state of optimal temperature adaptation. (Auth.)

B-30719
Nowosad, R., **Influence of krill meal and its fat particles on some metabolic processes of mice** [Wplyw maczki paszowej z kryla i jej frakcji tluszczowych na niektore procesy przemiany u myszy], *Akademia rolnicza we Wroclawiu. Weterynaria,* 1982 Vol.40, Zeszyty naukowe No. 139, p.47-55, In Polish. 13 refs.
DLC S469.P7A66a

To confirm the theory that negative effects of krill meal diet on animal health can be avoided through elimination of some components of krill, such as chitin and its fatty particles, experiments were conducted in 2 species of mice, divided in 7 groups of 40 animals each. The control group was fed a standard diet; the remaining groups received various amounts of krill meal out of which different amounts of chitin had been extracted. The results showed that both species fed the least amount of chitin thrived best.

B-30720
Abstracts of papers scheduled for the annual meeting of the Phycological Society of America at Colorado State University, Fort Collins, August 5-9, 1984, *Journal of phycology,* June 1984 Vol.20 (Suppl.), 32p.

Among the 163 abstracts are three related to antarctic algae. They are: Antarctic sea ice algae and marine phytoplankton, by G.A. Fryxell (Ref. 45); Antarctic freshwater algae, by R.A. Wharton, Jr. (Ref. 46); and Nitrogen fixation by blue-green algae at the Vestfold Hills, Antarctica, by A. Davey (Ref. 160).

B-30725
Christians, O., Leinemann, M., **Protein content in centrifuged body liquids of raw krill in relation to storage time** [Rohproteingehalt in abzentrifugierten Körpersäften in Abhängigkeit von der Vorlagerzeit des Rohkrill], *Informationen für die Fischwirtschaft,* 1983 30(1), p.52-54, In German. 4 refs.

Before processing raw krill it is necessary to separate the protease rich body fluids by centrifugation immediately after catching. During the 3rd German Antarctic Expedition, the raw protein content in centrifuged body fluids in correlation to the storage time was determined. The results are presented here.

B-30728
Sömme, L., **Insect life in Antarctica** [Insektliv i Antarktis], *Naturen,* 1978 102(6), p.257-263, In Norwegian.

The distribution of insects and mites in Antarctica and the subantarctic islands is reviewed and shown in a table. There are 67 known species of insects in this area (22 free living and 45 parasites), compared to 200 in Svalbard and 600 in Greenland. Investigations in Vestfjella and Bouvet Island during the 1976/77 Norwegian Antarctic Expedition are reported. They showed the antarctic insects and mites to be more tolerant of cold than those in other parts of the world. The origin of antarctic insects and mites (whether they survived since the time when antarctic temperatures were much warmer, or arrived later) is also discussed.

B-30734
Heilbronn, T.D., Walton, D.W.H., **Plant colonization of actively sorted stone stripes in the Subantarctic,** *Arctic and alpine research,* May 1984 16(2), p.161-172, 35 refs.

Three grasses *(Phleum alpinum L., Deschampsia antarctica Desv., Festuca contracta T. Kirk)* and one perennial herb *(Acaena tenera, Alboff)* are the earliest important colonizers of small-scale sorted stone stripes in fellfield areas on South Georgia. Survival potential differs considerably between the grass species and appears to be related to both tiller and root morphology. The principal species, *Phleum alpinum,* produces stable "islands" later colonized by other species. Its growth form and life cycle appear to be especially well adapted to this habitat. The rate of downslope movement of plants on a given slope appears to be directly related to size. The age of individual *Phleum* plants was assessed using morphological features and a relationship derived between age and number of tillers. A model is proposed describing the development of *Phleum* in fellfield areas, and its relationship to stabilization of the soil. (Auth.)

B-30735
Fogleman, V.M., **Antarctic krill: problems and potential,** *Marine Technology Society. Journal,* Winter 1983/84 17(4), p.29-35, 48 refs.

This paper briefly reviews the life cycle of krill, the role of krill in the Antarctic ecosystem, and the interest that krill has attracted thus far in terms of harvesting, processing, and marketing. (Auth.)

B-30739
Golosov, V.V., **Some biocenological aspects of the exploitation of the resources of antarctic krill,** *Polar geography and geology,* Jan./Mar. 1984 Vol.8, p.63-72, Translation of Leningrad. Universitet. Vestnik, No.12:95-103, 1980. 21 refs.

Known data on the life cycle of krill are reviewed and the conclusion is reached that water density variations and water circulation are the most important factors controlling krill distribution and numbers. While it is generally established that the life span of *Euphausia superba* in the ocean is of the order of 2 1/2-4 years it is suggested that it may well be longer under ideal circumstances. However, since, after spawning, the krill is carried down to abyssal depths by the descending water at the Antarctic Convergence it is rarely given the opportunity to achieve its maximum potential age. It is further suggested that this point in the life cycle, i.e., after spawning and before the downwards plunge at the Antarctic Convergence would be the optimal point for intense exploitation since it would have minimal impact on krill stocks or on the other components of the marine biocenosis. (Auth.)

B-30746
Bannasch, R., Lundberg, U., **Birdlife studies on King George Island** [Untersuchungen zur Avifauna von King George], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 No.11, p.5-33 + 42 plates, In German with English and Russian summaries. 51 refs.

Two large breeding colonies at Stanger Point and Barton Peninsula were included in the observations reported here. Abundance changes of 3 Pygoscelis species were observed on Ardley Island: In comparison with spring and summer in 1979/80 the Adelie population had increased whereas the number of Gentoos and Chinstraps was reduced. The distribution of the Southern Giant Petrel had changed, and the Blue-eyed Shag no longer bred on Ardley. Details of the incubation period of the Antarctic Tern were recorded. Feeding habits were studied by direct observation of the feeding behaviour and by analysing food residues and vomited stomach contents near the nests. Morphological and anatomical studies of the avian fore limb brought up new results about the hypothetical "shoulder lock" in Petrels and about the swimming of penguins, both complemented by field observations. First results from the banding programme were obtained, among them recoveries of 4 ringed Giant Petrels from Australia. During the 1981/82 expedition 588 birds were banded. (Auth. mod.)

B-30747
Bannasch, R., **Seal observations on King George Island** [Robbenbeobachtungen im Gebiet von King George], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 No.11, p.34-37, In German with English and Russian summaries. 13 refs.

As control data for population dynamics of antarctic seals, observations were made of five seal species as part of the GDR BIOMASS contribution. During the period Jan. 23, 1981-Feb. 20, 1982, population data were gathered on the antarctic fur seal, southern elephant seal, Weddell seal, crabeater seal, and leopard seal. These preliminary data are reported here.

B-30748

Rauschert, M., **Observations of marine fauna in the shore zone and on the sea bottom of King George Island** [Beobachtungen der marinen Fauna im Litoral und Benthal von King George (Südshetlandinseln, Antarktis)], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 No.11, p.38-55, In German with English and Russian summaries. 31 refs.

The foundation for the existence of vertebrates in the antarctic region lies in the southern polar ocean. The vertebrates also have trophic relations to the benthos. The benthos is very poor in the shallow water of the antarctic sea. There are few species and few individuals. However the zoobenthos is very richly developed in the deeper zones of the areas investigated in the Maxwell Bay. The zonations observed differ from the well known zonations in East Antarctica. The crustacean order Amphipoda is especially well represented and is an important link in the foodchain. The habitats in the Maxwell Bay are rocks, rubble, sand, and in deeper regions mud. Annually in the wintertime sea-ice is formed as a new substrate for a community of organisms with diatoms as primary producers and mainly phytophagous amphipods *(Gondogoneia antarctica)* as primary consumers. In contrast to the relative poverty of species and individuals in areas with quiet water (Bay of Ardley) there is a rich periphyton on the rocky grounds in regions with vehement current (Fildes Strait). (Auth.)

B-30749

Feiler, K., **Investigations of parasite infestations and food of various animal groups** [Untersuchungen zum Helminthenbefall und zur Nahrung verschiedener Tiergruppen], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 No.11, p.56-63, In German with English and Russian summaries. 13 refs.

Investigations were carried out from Jan. 1981 to Feb. 1982 on parasite infestation and food of fishes, birds and seals near Bellingshausen Station. Furthermore, various invertebrates were checked for parasite infestation. Juvenile stages of acanthocephalans were found in amphipods while larval stages of the trematode genus *Gymnophallus* parasitize the limpet *Patinigera polaris.* Frequencies of infestations in snails can be adapted to a theoretical frequency distribution. Trematodes and acanthocephalans prevail in fishes of the genus *Notothenia.* Most parasites were found within the muscles. Food of the fishes consists of snails, crustaceans, other fish, nemertines and algae. Generally, the occurrence of cestodes predominated in the birds investigated; sheathbills, Antarctic cormorants and Dominican gulls showed a broader spectrum of helminths. Krill is the main food of penguins with fish also being taken. Station refuse was a considerable part of the food in the birds investigated. Cestodes and acanthocephalans were found in the intestines of a fur seal. Large numbers of cestodes were found in the gut, and many acanthocephalans occurred in the outlet of the stomach of a leopard seal. Portions of crabeater flesh were found in the stomach of this animal. (Auth. mod.)

B-30766

Richter, W., **On south polar skuas at Schirmacher Oasis (Queen Maud Land, East Antarctica)** [Uber die Südpolaren Raubmöwen *(Catharacta maccormicki)* in der Schirmacher Oase (Königin-Maud-Land, Ostantarktika)], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.90-102, In German with English and Russian summaries. 12 refs.

Skuas appeared about two weeks after the Antarctic, Snow and Wilson's Storm Petrels, which breed in mid October in the Schirmacher Oasis (rare) and about 100 km to the south in the mountain ranges. Petrels are the main food source for the skuas. The South Polar Skuas are distributed about the Schirmacher Oasis with each pair occupying one of ten districts. When the skuas are breeding, they defend their nests, proclaiming jurisdiction over their territories. Four pairs had mated in distant nests, three with success, twice with two chicks. In one case there was no success because of egg loss. The skuas are described with regard to identification, habits, and distribution over the Schirmacher Oasis. (Auth.)

B-30769

Shibata, N., **Relation between freshness of antarctic krill and extractability of its muscular protein,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* July 1983 49(7), p.1089-1096, In Japanese with English summary. 16 refs.

The extractability and its biochemical properties of muscular protein with 0.45 M NaCl-phosphate buffer from washed muscle, free from digestive enzymes, have been studied in relation to freshness of muscle of antarctic krill *Euphausia superba.* Extraction method is described. The extractable protein thus obtained amounted to over 90% on the basis of total protein in the homogenate but its ATP-sensitivity as well as viscosity number was very low. With the lapse in the storage at 2 deg C, the amount of the extractable protein first decreased and then increased to the same level of that from the fresh muscle. These results revealed that not only the quantity but also the quality of the extractable protein from the muscle was strongly affected by the freshness of krill. (Auth. mod.)

B-30770

Shibata, N., Ozaki, H., **Effect of contamination of various tissues on the deterioration of fresh muscle from antarctic krill,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* July 1983 49(7), p.1097-1101, In Japanese with English summary. 10 refs.

The effect of contamination by various tissues, such as digestive organs, on the deterioration of fresh muscle of antarctic krill *Euphausia superba* was investigated in terms of the increase in the amount of water soluble protein and the loss of gel forming ability from the same muscle. The muscle was contaminated by homogenizing with various tissues in the medium containing 0.075 M NaCl. In the gel forming ability of muscle residue there was a striking deterioration upon contamination with the digestive organs such as hepatopancreas and stomach, and slightly with carapace and inner skin, while it was virtually unaffected with eye, heart and intestine. The content of water soluble protein in the muscle residues was increased by the contamination with various tissues, greatly with hepatopancreas or stomach, little with carapace and hardly with eye, heart and intestine. The same trend between the increase in the content of water soluble protein in the muscle residue and the loss of its gel forming ability was found during the cold-storage (3 deg C) of the muscle residues containing other tissues in the tail portion such as carapace and inner skin. (Auth.)

B-30771

Yamaguchi, K., **Composition of carotenoid pigments in antarctic krill *Euphausia superba*,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Sept. 1983 49(9), p.1411-1415, 11 refs.

The content of carotenoids in frozen krill was determined to be 3-4 mg/100 g. The carotenoids comprised astaxanthin diester (I), astaxanthin monoester (II), astaxanthin (III), and unidentified ones (IV) in 40-50%, 30-40%, 15-25%, and 5-15%, respectively. In the case of the krill meal, the content was 15-20 mg/100 g and the composition of I, II and IV was 65-75%, 15-25%, and 5-15%, respectively, lacking III. Two kinds of unique colored carotenoids of dense crimson and of violet occupied the major part of IV. Both were supposed to be esters of retro carotenoids. (Auth.)

B-30772

Miki, W., **Stability of carotenoid pigments in antarctic krill *Euphausia superba*,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Sept. 1983 49(9), p.1417-1420, 6 refs.

The stability to heat and solvent of carotenoids in krill *E. superba* was examined. When homogenates of the frozen krill were heated at 100 deg C, little change was noticed up to 1 hour in the content and composition of the carotenoids. After 3 hours of heating, however, the content decreased to less than half and the composition changed into 78% of astaxanthin diester (I) and 21% of astaxanthin monoester (II) with almost complete disappearance of astaxanthin (III) and unidentified carotenoids. As the stability test to solvent, purified I, II, and III were stored in four kinds of solvents, benzene, hexane, acetone, and ethanol, in darkness, at 15 deg, 0 deg, and -20 deg C up to 2 weeks and analyzed for the retained carotenoid. In benzene and hexane, I was the most stable without noticeable decomposition. In acetone and ethanol, I was remarkably decomposed at 15 deg C, although it was the most stable to heat and solvent. (Auth.)

B-30773

Shibata, N., Fujii, Y., **Elution profile of muscular protein from antarctic krill in sepharose C1-4B gel filtration,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Sept. 1983 49(9), p.1449-1458, In Japanese with English summary. 17 refs.

Muscular protein was freshly extracted with media containing high salt concentrations from antarctic krill *Euphausia superba* immediately after capture. The molecular composition of the extracted protein was roughly determined by sepharose C1-4B gel filtration. SDS-gel electrophoretic pattern, viscosity and ATPase activity were also measured to characterize the protein component in the extract. By gel filtration, the extracted protein with $I=0.5$ as well as $I=1.0$ media was separated into three protein fractions: A, B and C in order of molecular size from the large to the small. In addition to SDS-gel electrophoretic patterns of the three fractions, viscosity and ATPase activity of the extracted protein proved that the A and B fractions were composed of actomyosin with different molecular size. (Auth.)

B-30774

Fujita, T., **Pigmentation of cultured yellowtail with krill oil,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Oct. 1983 49(10), p.1595-1600, 16 refs.

The sole feeding of a formulated feed to yellowtail *Seriola quinqueradiata* induces poor dark grey color at the back and sides unlike the natural one of iridescent blue-green. The characteristic yellow band near the lateral line does not appear either. These color changes, however, could be improved by annexing to the formulated feed up to 2% of an oil extracted from the meal of the antarctic krill *Euphausia superba*. The krill oil contained 108 mg/100 g of carotenoids, which were composed of astaxanthin diester and astaxanthin monoester, 71% and 20%, respectively. The possibility that animals could metabolize astaxanthin to tunaxanthin is implied. (Auth.)

B-30775

Shibata, N., Ozaki, H., Fujii, Y., **Changes in physiochemical and biochemical properties of muscular proteins from antarctic krill *Euphausia superba* muscle stored at low temperature,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Nov. 1983 49(11), p.1721-1729, In Japanese with English summary. 16 refs.

The muscle collected from fresh antarctic krill *E. superba* was stored at 2 deg C. Physiochemical and biochemical properties or elution profile in sepharose C1-4B gel filtration of muscular protein extracted were studied. Extractability, viscosity, dependency of viscosity on protein concentration, ATP-sensitivity, flow birefringence and Mg-ATPase activity were low. The elution profile in gel filtration indicated that a large amount of the actomyosin extracted had relatively small molecular size. The values of the above-mentioned physiochemical and biochemical properties became high with the lapse of storage time, reaching a maximum within 2-3 days and then began to decrease. The Ca-ATPase and Mg-ATPase activities decreased very rapidly, whereas extractability and viscosity number were kept constant for a long time and tended to decrease after 9 days of storage. The elution profile of gel filtration of the extract from muscle stored for 9 days suggested that actomyosin of large molecular size occupied a large portion of the elute. (Auth.)

B-30776

Fujita, T., **Pigmentation of cultured red sea bream with astaxanthin diester purified from krill oil,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Dec. 1983 49(12), p.1855-1861, 24 refs.

Feeding frozen krill, krill meal, or oil extracted from the meal to cultured red sea bream *Pagrus major* resulted in its pigmentation. To see if astaxanthin diester (I), which is the common main carotenoid in those krill products, is effective, I purified from krill oil was added to a formulated feed at concentrations of 0.12-12.8 mg astaxanthin/100 g diet and a feeding experiment was conducted for 8 wk. I was effective, being superior to frozen krill and krill oil. Analysis of the integuments of the pigmented fish indicated that a part of I ingested by red sea bream was metabolized to tunaxanthin. (Auth. mod.)

B-30777

Shibata, N., Ozaki, H., Fujii, Y., **Separation of myofibrils from antarctic krill muscle and properties of gel obtained by heating,** *Japanese Society of Scientific Fisheries. Bulletin (Nippon suisan gakkaishi),* Dec. 1983 49(12), p.1921-1929, In Japanese with English summary. 12 refs.

The amount of salt soluble protein from myofibrils of antarctic krill *E. superba* muscle, and its physiochemical and biochemical properties, such as viscosity, ATP-sensitivity, flow birefringence, Mg-ATPase activity and gel-forming ability, were increased with the lapse of aging time of washed muscle at 2 deg C, reaching maximum values within few days. Based on these findings, a new method was developed to collect myofibrillar protein in high yield as debris of myofibrils from the muscle. The addition of sorbitol (circa 10%) to the myofibril preparation remarkably strengthened the gel formed by heating. (Auth. mod.)

B-30778

Jabłoński, B., **Distribution, numbers and breeding preferences of penguins in the region of the Admiralty Bay (King George Island, South Shetland Islands) in the season 1979-1980,** *Polish polar research,* 1984 5(1-2), p.5-16, With Russian and Polish summaries. 18 refs.

The number of breeding pairs of penguins nesting in the Admiralty Bay region during the 1979/1980 summer was as follows: *Pygoscelis papua*--3703, *P. adeliae*--32918, *P. antarctic*--8237. Due to diverse preferences in selection of the breeding-site environment and varying population and structure of the colonies of these species the conditions of the outflow of faeces to the sea varied considerably. Long period records of the populations of penguin colonies around Pt. Thomas and Llano Pt. show increase in the number of breeding pairs of *P. papua* and *P. antarctica* and an increase in the number of *P. adeliae* at Llano Pt., while at Pt. Thomas the data approximate the records for the summer 1909. (Auth.)

B-30779

Jabłoński, B., **Distribution and numbers of penguins in the region of King George Island (South Shetland Islands) in the breeding season 1980-1981,** *Polish polar research,* 1984 5(1-2), p.17-30, With Russian and Polish summaries. 24 refs.

In the 1980-1981 breeding season nesting of 9762 pairs of *Pygoscelis papua,* 59356 pairs of *P. adeliae,* 302388 pairs of *P. antarctica* and 1 pair of *Eudyptes chrysolophus* were observed in the region of King George Island. Most of *P. antarctica* rookeries were located in the hitherto unexplored cliffy coast in the northern part of the island. The hypothesis is made that the recent increase in penguin population is mainly due to the retreat of glaciers and the resulting exposure of new places suitable for breeding sites. (Auth.)

B-30782

Kalinowski, J., **Biomass of krill in the eastern part of Bransfield Strait, March 1981,** *Polish polar research,* 1984 5(1-2), p.99-105, With Russian and Polish summaries. 5 refs.

Results from hydro-acoustic studies for evaluation of the *Euphausia superba* biomass in Bransfield Strait in March 1981 are presented. These investigations, called conventionally Micro-FIBEX, were carried out on the r/v *Profesor Siedlecki* during March 13-16, 1981, in continuation of the studies carried out in that region within the scheme of the FIBEX program of March 5-12, 1981. The abundance of the biomass was estimated at 258 thousand ton. (Auth.)

B-30783

Mucha, M., **Biomass estimates of commercial fishes in the South Georgia region (by "swept area" method),** *Polish polar research,* 1984 5(1-2), p.107-112, With Russian and Polish summaries. 3 refs.

The paper presents the results of biomass estimates of commercial fishes in the South Georgia region made by "swept area" method on the basis of catch statistics of a B-22 Polish trawler in the 1980/1981 season. Total biomass was estimated at about 110,000 t. The results of estimates of this kind, made on the basis of commercial bottom catches, especially as regards regions where many species of fish occur, usually contain considerable random and systematic errors.

B-30784

Czeczuga, B., Gutkowski, R., Czerpak, R., **Studies on the carotenoids of the *Embryophyta*. 7. Representatives of the families *Graminae* and *Caryophyllaceae* from King George Island (South Shetland Islands),** *Polish polar research,* 1984 5(1-2), p.113-120, With Russian and Polish summaries. 29 refs.

Carotenoids of two species of the Antarctic higher plants from King George Island were analyzed. Using thin-layer and column chromatography 16 carotenoids were identified. The total carotenoid content ranged from 4.064 to 17.257 mg/g of dry weight material. Both plants, *Colobanthus quitensis* and *Deschampsia antarctica* contained the highest amount of dry mass in February. (Auth. mod.)

B-30785

Czeczuga, B., **Studies of carotenoproteins in animals, 10. *Euphausia superba* Dana 1852 *(Crustacea, Euphausiacea),*** *Polish polar research,* 1984 5(1-2), p.121-128, With Russian and Polish summaries. 31 refs.

Carotenoprotein compounds containing astaxanthin as a prosthetic group were isolated from the body of antarctic krill *Euphausia superba.* The material analyzed consisted of 250 g of homogenized specimens (whole body) caught during the 1978 Antarctic Expedition on the r/v *Profesor Siedlecki.* The material was collected near King George Island during the spring and kept in cold storage at -10 C. (Auth. mod.)

B-30786

McGinnis, R.F., **Biogeography of lanternfishes (Myctophidae) south of 30 S,** *American Geophysical Union. Antarctic research series,* 1982 Vol.35, Biology of the antarctic seas 12, 110p., With two appendixes. Refs. p.103-110. For the same item from a different source see 8B-15050.

A total of 84 nominal species of lanternfishes (Myctophidae) occur in the Southern Hemisphere south of 30 S. The distributions of these species have been analyzed in relation to the hydrology of the area. Antarctic/Antarctic polar front, subantarctic, transitional water, and warm water lanternfish complexes, each reflecting a pattern of distribution associated with major hydrographic phenomena, are defined and discussed. It is concluded that systems of oceanic circulation, as well as vertical distribution and inherited tolerances of these fishes to environmental variables, are important in determining their distribution. Endemic genera have been shown to occur in antarctic-subantarctic, southern transitional, cold north Pacific, and warm water regions of the World Ocean. A consideration of paleontological and paleoceanographic literature leads to the hypothesis that conditions conducive to the evolution of these genera existed in the Oligocene era, the family achieving its present level of generic differentiation by the Miocene era. It is suggested that recent lanternfish complexes evolved from early Tertiary faunas during the marked climatic and oceanographic fluctuations of the Pliocene and Pleistocene eras. (Auth.)

B-30790

Parukhin, A.M., Liadov, V.N., **Parasite fauna of Notothenioidei from the Atlantic and Indian Oceans** [Parazitofauna nototenievidnykh ryb (Notothenioidei) iz vod Atlanticheskogo i Indiĭskogo okeanov], *Vestnik zoologii,* May-June 1981 No.3, p.90-94, In Russian with English summary. 11 refs.

Parasitological study of 1189 specimens of 13 species of fish from Nototheniidae and Chaenichthyidae families, off South Georgia, the Kerguelen Islands and the Falkland Islands, is reported. 33 species of worms, 3 species [illegible]awfish and 2 species of leeches are identified; a considerable difference in the parasite fauna composition of Nototheniidae from the Atlantic and Indian Oceans is noted.

B-30792

Makarov, R.R., **Biology of reproduction in Euphausiidae. Secretion of spermatophores in *Euphausia superba* (Crustacea, Eucarida)** [K izucheniiu biologii razmnozheniia evfauziid. Vydelenie spermatoforov u *Euphausia superba* (Crustacea, Eucarida)], *Zoologicheskiĭ zhurnal,* May 1981 60(5), p.685-694, In Russian with English summary. 20 refs.

The variants of spermatophore position and of structure of the spermatophore complex genitalia were studied in sexually mature male *Euphausia superba.* The secretion of spermatophores from the ejaculatory duct ampullae which should precede the transfer of spermatophores onto the female thelycum proceeds by means of two-cycle contraction of the ampullae. The structure of spermatophores attached to the female thelycum, transformation of their elements taking place after the attachment are described, as well as the mechanism of sperm transfer from the spermatophore heads into the thelycum. It is suggested that the transfer of spermatophores upon mating is realized by means of appendix masculina only, whereas the petasmae are utilized to catch the thelycum plates. The state of spermatophores differs in the mature males caught at different depths. In many males from the layer below 200 m the spermatophores were suspended on the gills, the ampullae were contracted and empty, whereas in the males from the surface layers the spermatophores were, as a rule, within the ampullae. The migration of the males to considerable depths appears to to be related to the preparation for mating. (Auth.)

B-30793

Androsova, E.I., **Morphological peculiarities of antarctic Bryozoa** [Morfologicheskie osobennosti antarkticheskikh mshanok (Bryozoa)], *Zoologicheskiĭ zhurnal,* May 1981 60(5), p.718-724, In Russian with English summary. 4 refs.

The fauna of antarctic Bryozoa is characterized by great species diversity and high abundance. The characteristic peculiarities are intraspecies, individual, intracolonial and age variability of morphological features, as well as gigantism, diversity and multiplicity of structure of those zooids which have the function of colony protection. The species are cited which illustrate these assumptions. (Auth.)

B-30795

Hoepffner, N., **Photosynthetic adaptation strategies in antarctic diatoms: number and size variations of photosynthetic units** [Stratégies d'adaptation photosynthétique chez des diatomées de l'Océan Antarctique: variations du nombre et de la taille des unités photosynthétiques], *Journal of plankton research,* 1984 6(5), p.881-895, In French with English summary. Refs. p. 892-895.

The diatoms *Nitzschia turgiduloides* and *Chaetoceros deflandrei,* collected between february and March 1980 in the Indian sector of the antarctic ocean, were maintained in laboratory cultures under varying light intensities. The production versus irradiance curves, per cell and per chlorophyll *a* suggest, according to the method of Richardson *et al.* (1983), a photoadaptation of these species: their photosynthetic units varying in size and number depending on light intensity. From the ecological point of view, the photosynthetic parameters under limiting and saturating light are low compared to that of temperate diatoms, and are characteristic of 'shade plankton': chlorophyll *a* concentration and productivity per cell are higher when they are exposed to low irradiance. This work shows the importance of light with regard to the low temperature for primary production in the antarctic ocean. (Auth.)

B-30808

Odening, K., **Biological activities within the framework of the Soviet Antarctic Expeditions (25th-29th, 1979-1984),** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.36-41, With German and Russian summaries.

GDR biological investigations began in 1979-80 and have included studies of many species of sea birds on the continent and offshore islands. Breeding behavior was studied and a bird banding program has been introduced. Other studies were made on seals, food chains, and creatures parasitical on birds, fish, seals, and invertebrates.

B-30818

Wolff, M., **Krill lifespan revised,** *Ascent,* Nov. 1984 No.5, p.46.

A researcher at Monash University in Melbourne, Australia has developed a new technique for determining krill age. He has found that krill could live for seven years or longer. The method and physiological aspects involved are explained.

B-30819

Zdzitowiecki, K., Szelenbaum-Cielecka, D., ***Anomotaenia dominicana* (Railliet et Henry, 1912) *(Cestoda, Dilepididae)* from the Dominican gull *Larus dominicanus* Licht. of the Antarctic,** *Acta parasitologica polonica,* March 31, 1984 19(1-8), p.49-58, With Polish summary. 9 refs.

Out of 17 *L. dominicanus* from King George Island, 12 were infected with *A. dominicana.* A complete morphological description is given. *A. micracantha* and *A. dominicana* are recognized as distinct species in contrast with the view of Joyeux Baer (1954) who regarded them as subspecies of *A. micracantha.* The size of rostellar and embryonic hooks indicates that *A. dominicana* includes tapeworms which exclusively parasitize *L. dominicanus* of the Southern Hemisphere. (Auth. mod.)

B-30820

Czeczuga, B., **Carotenoids in fish. 34. Carotenoids in individuals of certain antarctic species of fish of different ages** [Karotenoidy u ryb. 34. Karotenoidy u roznych wiekowo osobnikow niektorych gatunkow ryb z Antarktydy], *Acta ichthyologica et piscatoria,* 1982 12(1), p.107-116, With Polish and Russian summaries. 15 refs.

By means of columnar and thin-layer chromatography, the author investigated the presence of various carotenoids in six fish species from the Antarctic, *(Dissostichus eleginoides, Notothenia gibberifrons, Pseudochaenichtys georgianus, Trematomus hansoni, Trematomus bernacchii* and *Bathydraco macrolepis).* The presence of the 20 carotenoids was found. The total content of carotenoids ranges from 0.011 *(Notothenia gibberifrons,* 35.0 cm body length) to 1.291 micrograms/g wet weight (fins of *Bathydraco macrolepis).* (Auth.)

B-30822

Schwaller, M.R., Benninghoff, W.S., Olson, C.E., Jr., **Prospects for satellite remote sensing of Adelie penguin rookeries,** *International journal of remote sensing,* Sept.-Oct. 1984 5(5), p.849-853, 9 refs.

Future conservation efforts are expected to require population statistics for southern ocean species, including penguins. Preliminary laboratory spectral reflectance measurements are presented of penguin plumage plus some of the major components of the antarctic environment. A sketch is presented of the prospects for employing remote sensing systems for monitoring penguin populations on a regional scale. (Auth.)

B-30824

Burchett, M.S., DeVries, A., Briggs, A.J., **Age determination and growth of *Dissostichus mawsoni* (Norman, 1937) (Pisces, Nototheniidae) from McMurdo Sound (Antarctica),** *Cybium,* March 31, 1984 8(1), p.27-31, With French summary. 8 refs.

Age determination of *D. mawsoni* from otoliths was made possible by the use of a thin sectioning technique. From counts of annular increments, the specimens sampled were of age classes 7-31 yr. (Auth.)

B-30826

Rauschert, M., **Diver in the south polar sea** [Als Taucher im Südpolarmeer], *Urania,* 1984 60(8), p.58-63, In German.

Three researchers spent two years diving in the waters of the southern ocean to participate in a complex biological program studying birds, seals, krill, fish, and other marine biota. The very cold water temperature in McMurdo Sound, lack of red blood in ice fish, and blood and circulation of other fish are discussed. A schematic diagram is included of the distribution of bottom dwellers from the surface to 40m. In connection with the BIOMASS program, population numbers are given for fish south of the Convergence.

B-30828

Bannasch, R., **Birds of Antarctica—objects of our studies** [Vögel der Antarktis—unsere Studienobjekte], *Urania,* 1984 60(8), p.68-71, In German.

A brief discussion is given of the populations of various bird species found on King George Island, particularly the penguins. A food chain is suggested for the birds both as predator and prey, with krill near the bottom. A chart is provided comparing external features of seven species of penguins.

B-30832

Hayward, P.J., Taylor, P.D., **Fossil and recent Cheilostomata (Bryozoa) from the Ross Sea, Antarctica,** *Journal of natural history,* Jan.-Feb. 1984 18(1), p.71-94, With appendix. 26 refs.

Fifty-six species of cheilostome Bryozoa have been identified in samples from the McMurdo Sound area of the Ross Sea. Material collected alive from beneath the permanent ice sheet, at White Island and Cape Bird, is supplemented by fossil material collected from a coastal moraine deposit at Black Island. The moraine is thought to have formed through the ablation of grounded ice containing benthic deposits which have been subject to upward migration through the ice sheet, by a process of surface melting and basal ice accretion. The fossils are of presumed Quaternary age approximately 3060 years B.P. and were in an excellent state of preservation. (Auth.)

B-30833

Burckle, L.H., **Diatom distribution and paleoceanographic reconstruction in the southern ocean—present and last glacial maximum,** *Marine micropaleontology,* Sept. 1984 9(3), p.241-261, Refs. p.259-261.

Diatom assemblage and preservational data are used to reconstruct paleoceanographic conditions at the last glacial maximum (18,000 yrs BP) in the southern ocean. From these data, the following points can be made about the last glacial maximum in this region. (1) Contraction and slight northern shift of the belt of well preserved diatoms appears to be related to the northward shift of late spring/early summer sea ice cover. (2) Presence of open-ocean, though poorly preserved, diatom assemblages to the south of this belt strongly suggests that, during many summers, large areas of the southern ocean were ice-free. (3) The distribution of the *Nitzschia kerguelensis* factor, both in surface sediments and at the last glacial maximum, indicates that the gyre systems, particularly the Weddell Gyre, were intensified during glacial times. (4) Although data are sparse in the higher-latitude southern Atlantic, there is an indication that the Weddell Polynya also existed during glacial times, although it was shifted a few degrees northward. (Auth.)

B-30836

Abrams, R.W., **Distribution of seabirds in the African sector of FIBEX,** *South African journal of antarctic research,* 1983 Vol.13, p.24-28, In English with Afrikaans summary. 16 refs.

A quantitative account of the abundance of seabirds (excluding penguins) in relation to environmental features in a small area of the Southern Indian Ocean is presented. Plankton-eating birds were abundant. Piscivorous birds were less numerous, but their biomass was slightly higher than that of the planktivores. Cephalopod-eaters and species in a mixed-diet class were widespread, but not as abundant as either planktivores or piscivores. Planktivores were most abundant in a narrow latitudinal band at 61-63 S. High planktivore abundance was correlated positively (about 33%) with relatively warm air and surface-water temperatures and low barometric pressure, and high piscivore abundance (about 32%) with weak winds and cloudy to wet weather. The abundance of cephalopod-eaters correlated very poorly (about 4%) with these variables. (Auth.)

B-30837

Hes, A.D., Roux, J.P., **Population increase in the sub-Antarctic fur seal *Arctocephalus tropicalis* at Amsterdam Island,** *South African journal of antarctic research,* 1983 Vol.13, p.29-34, In English with Afrikaans summary. 19 refs.

The breeding population of *Arctocephalus tropicalis* at Amsterdam Island during the 1981/82 summer consisted of approximately 6,070 adult males and 19,657 adult females, with 16,512 pups born. These estimates were derived by applying correction factors for undercounting, pup mortality, pregnancy rate and seasonal cycle. Extension of breeding colony sites has occurred since previous censuses in 1955/56 and 1969/70, concomitant with an initial annual intrinsic rate of population increase of 7.8% to 1969/70, followed by an exponential phase of 16.5% to 1981/82. Localised population increases were used to describe the process of recolonization. (Auth.)

B-30839

Schramm, M., **Predation by subantarctic skuas *Catharacta antarctica* on burrowing petrels at Marion Island,** *South African journal of antarctic research,* 1983 Vol.13, p.41-44, In English with Afrikaans summary. 14 refs.

Petrel remains were collected from around 27 subantarctic skua *Catharacta antarctica* nests at Marion Island. Skuas took seven species of burrowing petrels, with Salvin's prion *Pachyptila salvini* forming the dominant prey item. The use of skua prey remains as indicators of petrel was shown for two areas where the density and composition of petrel burrows had been determined. Although the composition of the remains was related mainly to the abundance of the petrels, breeding season and size also determined how well different species were represented. (Auth.)

B-30840

French, D.D., Smith, V.R., **Note on feeding of *Pringleophaga marioni* Vietti larvae at Marion Island,** *South African journal of antarctic research,* 1983 Vol.13, p.45-46, In English with Afrikaans summary. 5 refs.

Larvae of the Lepidopteran *Pringleophaga marioni* Viette form an important component of the soil macrofauna at sub-Antarctic Marion

Island. They were previously considered as herbivores, feeding on plant roots and rhizomes. Captive larvae are omnivorous and will aggressively attack and devour earthworms. The significance of this carnivory in the field is unknown but the larvae and earthworms occur together in the upper peat layers of many of the island plant communities. (Auth.)

B-30841

Cooper, J., **Bird ringing at Gough Island, 1977-1982,** *South African journal of antarctic research,* 1983 Vol.13, p.47-48, In English with Afrikaans summary. 7 refs.

Bird ringing activities at Gough Island are summarized for the period December 1977 to November 1982. 772 birds of six species were ringed during the period and 44 recaptures have been recorded at Gough Island since 1955. Two birds have been recovered or recaptured elsewhere during the review period. Only one foreign-ringed bird has as yet been recorded at Gough Island. (Auth.)

B-30842

Randall, B.M., Randall, R.M., Roussouw, G.J., **Plastic particle pollution in great shearwaters *(Puffin gravis)* from Gough Island,** *South African journal of antarctic research,* 1983 Vol.13, p.49-50, In English with Afrikaans summary. 12 refs.

The combined gut contents of two great shearwaters *Puffinus gravis* were found to contain 44 separate plastic particles with a total mass of 1.383 g. The particles were identified as high density polyethylene, low density polyethylene, crosslinked polyolefin and nylon. Analysis showed that 95% of the particles were polyethylene. The source of the plastic particles was not determined but they were probably derived from their prey. In view of possible adverse physical and chemical effects monitoring of the occurrence of these plastic particles is necessary. (Auth.)

B-30843

Krynauw, J.R., Allen, A.R., Auret, S.H., Von Brunn, V., **Note on breeding sites of snow petrels *(Pagodroma nivea)* at Robertskollen, Boreas and Passat nunataks and Johnsbrotet, western Dronning Maud Land, Antarctica,** *South African journal of antarctic research,* 1983 Vol.13, p.51-53, In English with Afrikaans summary. 7 refs.

Previously unrecorded colonies of the snow petrel are described. A south polar skua was observed at Johnsbrotet and Wilson's storm petrel at Robertskollen. No nests of the two species were recognized. (Auth. mod.)

B-30850

Bannasch, R., **Zoological studies in the area of Bellingshausen Station** [Zoologicheskie issledovaniia v raĭone stantsii Bellingsgauzen], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.37-42, In Russian. 7 refs.

Population and geographic distribution of various species of birds and seals, found around the Antarctic Peninsula and South Shetland Islands in the course of studies carried out between November 1979 and February 1980, is given. Included are: Adélie, chinstrap, and gentoo penguins; giant, cape, Wilson's storm and black-bellied petrels; blue-eyed cormorants; snowy sheathbills; great skuas; kelp gulls; antarctic terns; sea elephants, fur, Weddell, crabeater, and leopard seals.

B-30851

Kaup, E.B., **Biogenic elements in Schirmacher Ponds in natural conditions and following human activities** [Biogennye elementy v vodoemakh oazisa Shirmakhera v prirodnykh usloviiakh i pod antropogennym vozdeĭstviem], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.42-48, In Russian. 13 refs.

From data collected in Schirmacher Ponds, significantly high concentrations of biogenic elements in atmospheric precipitation and meltwater are reported. Chemical analyses of bottom sediments, ice cover, and water contaminated by human activity show high concentrations of phosphates, nitrates and ammonia.

B-30852

Wróblewski, R.J., **Preliminary results of biological studies at Mirnyy Station in the winter 1979** [Predvaritel'nye rezul'taty biologicheskikh issledovaniĭ v observatorii Mirnyĭ zimoĭ 1979 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.49-59, In Russian. 12 refs.

Physiological and morphological studies in 2 species of fish from the Davis Sea area near Mirnyy Station, *Trematomus bernacchii* and *T. borchgrevinki,* are reported. Measurements of body proportions in relation to oxygen need, and daily respiratory variations taken in waters 10 m deep and in temperatures between -1.85 and -1.90 C, are tabulated and discussed.

B-30886

Bellisio, N.B., Tomo, A.P., **Biogeography of the Antarctic Peninsula and its adjacent archipelagos and seas** [Biogeografía de la península Antártica, archipiélagos y mares adyacentes], Buenos Aires, Instituto Antártico Argentino, 1974, 222p., In Spanish with German, French and English summaries.

The most representative flora and fauna of the Antarctic Peninsula are described in this work. Studied in particular are the microorganisms, their ecology, geographic distribution and frequency. The work is based on data gathered by participants in fourteen research cruises in different areas of the Peninsula and around the neighboring islands. Many geographical charts, six zoogeographic representations, and one hundred and fifty photographs are included. (Auth.)

B-30888

Hoshiai, T., ed, Fukuchi, M., **Proceedings of the Sixth Symposium on Polar Biology,** *National Institute of Polar Research, Tokyo. Memoirs,* August 1984 Special issue No.32, 168p., Refs. passim. For individual papers see B-30889 through B-30902, B-30904 through B-30906 and E-30903.

The sixth Symposium on Polar Biology was held at the National Institute of Polar Research, Tokyo, from Sept. 8 to 10, 1983. The symposium consisted of the following scientific sessions: physical and chemical environment, primary production, zooplankton and micronekton, fish and benthos, sea birds and marine mammals, and chlorinated hydrocarbons. Two papers on marine biological phenomena in the Northern Hemisphere, and eighteen in the Southern Hemisphere, are included in this volume.

B-30889

Hara, S., Tanoue, E., **Choanoflagellates in the antarctic ocean, with special reference to *Parvicorbicula socialis* (Meunier) Deflandre,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.1-13, 27 refs.

Distribution and morphology of choanoflagellates, collared heterotrophic flagellates bearing an extracellular siliceous lorica, are reviewed. Eleven species are reported from the antarctic ocean. Three of the eleven are known to be endemic to the Antarctic, the other eight are found in various oceanic areas. Choanoflagellates are found in both ice and water, which suggests their wide and abundant distribution in the Antarctic. The ecological significance of the choanoflagellate, *Parvicorbicula socialis* (Meunier) Deflandre, most common species in the Antarctic, as the food of *Euphausia superba* Dana, is stressed. Morphological variation of the lorica structure of *P. socialis* caused by water temperature is discussed. (Auth.)

B-30890

Okamoto, T., Takahashi, E., **Taxonomy and distribution of some *Ceratium* species in the antarctic ocean,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.14-24, 14 refs.

7 species of *Ceratium—C. pentagonum, C. lineatum, C. kofoidii, C. minutum, C. fusus, C. horridum* and *C. petersii*--are discussed. *C. minutum* is new to the antarctic ocean. *C. pentagonum* is predominant in some specific areas. Limiting factor of distribution of *C. fusus* in the antarctic ocean is also discussed. (Auth.)

B-30891

Kawamura, A., Ichikawa, T., **Distribution of diatoms in a small area in the Indian sector of the Antarctic,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.25-37, 15 refs.

During the Pre-FIBEX cruise of the R.V. *Kaiyo Maru* to the Indian sector of the Antarctic in 1979/80, a small area surrounded by 61 and 65 S parallels and 100 and 120 E meridians was investigated. At 37 hydrographic stations surface samples were collected and subsurface samples at 9 stations. Of 54 species identified, 7 species accounted for more than 72% of the total cells of diatoms. They were *Fragilariopsis 'nana', F. rhombica, F. kerguelensis, F. curta, Nitzschia 'closterioides', N. pungens,* and *Dactyliosolen* spp. The abundance of diatoms and the distribution of diatom species showed significant horizontal variations within a small spatial scale. It is suggested that the local concentrations of *Euphausia superba* have a close relationship to the peculiar species of diatoms rather than to the diatom communities. (Auth. mod.)

B-30892

Sasaki, H., **Distribution of nano- and microplankton in the Indian sector of the southern ocean,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.38-50, 13 refs.

Standing stock and distribution of phytoplankton chlorophyll were studied in the Indian sector of the southern ocean, along the course of the *Fuji* from December 1982 to March 1983. Surface observations showed that the mean chlorophyll concentrations in the subantarctic and antarctic waters in December were higher than those in February-March. Surface standing stocks of nanoplankton (<10 micron) did not change greatly over different water masses, while the microplankton (>10 micron) showed a wide fluctuation and the relative contribution generally increased with increasing total phytoplankton concentration. Integrated chlorophyll stocks in February-March were in a range of 16-38 mg/sq m (0-200 m) with microplankton contributions of 35-79%. (Auth.)

B-30893

Fukuchi, M., Tanimura, A., Ohtsuka, H., **Seasonal change of chlorophyll *a* under fast ice in Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.51-59, 12 refs.

Chlorophyll *a* concentration in water columns under the antarctic fast ice was measured at five stations (10-675 m depths) near Showa Station for a period of 13 months, from January 1982 to January 1983. High chlorophyll *a* concentrations were seen between December and March, while peaks were observed in late January. This phenomenon seemed to be caused by a slight increase of temperature (>-1.73 C) and a slight decrease of salinity (<34.15). Average chlorophyll *a* stock in water columns was at least one order of magnitude higher than that reported from the antarctic open water. (Auth.)

B-30894

Tanimura, A., Fukuchi, M., Ohtsuka, H., **Occurrence and age composition of *Paralabidocera antarctica* (Calanoida, Copepoda) under the fast ice near Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.81-86, 8 refs.

A year-round observation of *Paralabidocera antarctica,* an endemic copepod near Showa Station, is reported. *P. antarctica* occurred in the spring-to-summer season, between late September and late January, and was very abundant while the phytoplankton biomass was high. The *P. antarctica* population which appeared in late September to early November was composed of copepodite stages I, II and III. Developmental stage progressed from middle November to middle December. In middle December, the *P. antarctica* population consisted mostly of adults with a few individuals of copepodite stage V. After late December, it consisted of adults only. *P. antarctica* seems to have one generation a year. (Auth.)

B-30895

Tanoue, E., Hara, S., **Chemical and biological characteristics of fecal pellets of *Euphausia superba* Dana,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.87-88.

Fecal pellets of *Euphausia superba* and krill's food algae were analyzed to evaluate differences in organic composition between them. Organic carbon and total nitrogen contents of the pellets were comparable to those of the plankton but higher than those of particulate matter. Carbohydrate and amino acid contents were lower than those of the plankton but, again, higher than those of particulate matter. The percentage of fatty acid carbon to organic carbon of the pellet accounted for 8.5%, which was higher than that of both the plankton and the particulate matter. The importance of the nanozooplankter in krill's nutrition is discussed in relation to the recycling of organic matter in the Antarctic.

B-30896

Nemoto, T., Okiyama, M., Takahashi, M., **Aspects of the roles of squid in food chains of the antarctic marine ecosystems,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.89-92, 2 refs.

Seventy-six specimens of large and small squid, ca 35.5 and 4 cm in mantle length, collected between 90 and 50 deg W north of South Shetland Islands, are discussed. Various species are identified, but two are found dominant: *Kondakovia longimana* and *Moroteuthis knipovitchi.* These feed primarily on krill and, in turn, are found in stomachs of sperm whales. Size distribution and seasonal variation of distribution depth of squid caught by trawl in the Antarctic and in stomachs of sperm whales are shown.

B-30897

Iwami, T., Abe, T., **Gill arches of fishes of the suborder Notothenioidei (Pisces, Perciformes),** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.93-102, 20 refs.

Gill-arch structures of 34 species belonging to five families of the suborder Notothenioidei were studied in detail. Remarkable differences among notothenioid gill arches were recognized mainly in the degree of ossification of basibranchials, the dentition on the epibranchial, and the shapes of the hypobranchial and paryngobranchials. On the basis of the character analyses of these osteological features, the relationships among notothenioid families are inferred. The family Bovichthyidae is recognized as the most primitive group among five families, while the Channichthyidae seems to be the most advanced one. The Harpagiferidae is clearly identified as a distinct family from the Nototheniidae. (Auth.)

B-30898

Sakakibara, S., Tobayama, T., Hoshiai, T., **Rearing of antarctic marine organisms in Japan,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.103-104.

A study aimed at keeping antarctic marine organisms alive as long as possible in Japan is described. Three kinds of nototheniid fish, an echinoid, an asteroid, a gastropod, a nemertine, two unidentified kinds of ascidian, an unidentified amphipod and a red alga were collected from the coastal waters near Showa Station in early February 1982. The specimens were stored on ship and transported to Japan in about 70 days. Mortality was low throughout the cruise and until July 1983. It is concluded that long-term rearing of antarctic marine organisms in Japan is feasible.

B-30899

Numanami, H., Kosaka, M., Naito, Y., Hoshiai, T., **Distribution of carnivorous benthic invertebrate in the northeastern part of Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.105-111, 9 refs.

Benthic invertebrates were collected at 35 stations scattered in the northeastern part of Lützow-Holm Bay from May to September 1980. A total of 1103 carnivorous benthic invertebrates was obtained, consisting of 41 species belonging to eight classes, with *Ophinotus victoriae* representing 59.7% of the total caught. *Neobuccinum eatoni* was second in number. Only one specimen was collected in 22 other species. More species were found in the shallow continental shelf than in deep glacial trough. Species number was also larger in the northern part of the study area than in the southern part. The relation between the distribution of invertebrates and the bottom topography of a small area was studied in the Kita-no-ura Cove. (Auth.)

B-30900

Ohno, M., **Culture of an antarctic seaweed, *Phyllophora antarctica* (Phyllophoraceae, Rhodophyceae),** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.112-116, 7 refs.

An Antarctic seaweed, *Phyllophora antarctica* was collected beneath the sea ice of the coast of East Ongul Island of Lützow-Holm Bay. The specimens were carried to the laboratory in Japan by the icebreaker *Fuji,* and kept at controlled temperature in an incubator for two years. New fronds appeared from the margin of older thalli at a temperature of 3 C and light intensity of about 300 lx. These plants were maintained under several culture conditions for a long time, but the reproductive organ did not appear on the fronds. The optimum temperature for the growth of the fronds was about 3 C. The optimum temperature for photosynthetic activity was between 10 C and 15 C under light intensity of 10000 lx. (Auth.)

B-30901

Hoshiai, T., Sweda, T., Tanimura, A., **Adélie penguin census in the 1981-1982 and 1982-1983 breeding season near Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.117-121, 3 refs.

Results of Adélie penguin population census in the 1981-82 and 1982-83 breeding seasons in East Antarctica are described. The record of a newly found rookery in Tenmondai Rock on the Prince Olav Coast is included. The Adélie penguin populations, which continuously decreased after the 1970-71 season in the rookeries of Ongulkalven, Mame-zima Island and Rumpa, remarkably increased during the two seasons studied. The relation between the fluctuation of Adélie penguin population and the sea ice condition around the rookeries in the summer is discussed. (Auth.)

B-30902

Nishiwaki, M., **Significance of 55 deg S in the "Indian Ocean Sanctuary of Whales" in relation to the distribution of marine mammals,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.122-129, 25 refs.

A Symposium on Marine Mammals of the Indian Ocean was held at Colombo, Sri Lanka, 1983. At this symposium it was recommended that the Indian Ocean Sanctuary of Whales, which was established by the International Whaling Commission in 1979, should be extended as far as Antarctica, or south of 55 deg S. The baleen whales are distributed over 55 S, while most smaller toothed whales are distributed in the waters north of 55 S, and sirenians never appear in colder waters. Therefore, the only groups which are substantially affected by the new expanded sanctuary are the baleen whales, sperm whales, medium-sized toothed whales and pinnipeds. (Auth.)

B-30904

Tanabe, S., Mori, T., Tatsukawa, R., **Bioaccumulation of DDTs and PCBs in the southern minke whale *(Balaenoptera acutorostrata),*** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.140-150.

DDTs and PCBs were determined in the liver of male minke whales collected from the southern ocean during the 1980-1981 whaling season. DDTs ranged from 3.6 to 70 ng/g and PCBs from 1.2 to 18 ng/g on lipid weight basis. These values were lower than those in northern baleen whales and also in southern toothed whales. This seems to be attributable to the smaller extent of contamination in the Southern Hemisphere and the habit of minke whales feeding on lower trophic organisms, primarily euphausiids, in the antarctic ecosystem. Considerably high concentrations of DDTs and PCBs were found in young minke whales and a continuous increase of these was observed in older animals after approximately 20 years of age. (Auth.)

B-30905

Hidaka, H., Tanabe, S., Kawano, M., Tatsukawa, R., **Fate of DDTs, PCBs and chlordane compounds in the antarctic marine ecosystem,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.151-161, 20 refs.

Bioaccumulation and environmental behavior of DDTs, PCBs and chlordane compounds in the antarctic marine ecosystem under the fast ice were studied. Many samples such as seawater, benthic invertebrates, fishes, Weddell seal etc., were collected at the Tottsuki Point and from Showa Station. In seawater samples, the concentration of PCBs was found to be higher than that of DDTs but reverse in organisms. Chlordane concentrations showed the middle level between PCBs and DDTs in both seawater and organisms. In higher trophic level organisms, the bioconcentration factors increased, and variable compositions of PCBs and chlordane compounds were also found. Concentration levels of DDTs and PCBs in the antarctic marine ecosystem were about two orders of magnitude lower than those in the western North Pacific. (Auth.)

B-30906

Yamanaka, M., Kagawa, H., **Distribution and abundance of soil bacteria in the vicinity of Syowa station in Antarctica, with special reference to habitat conditions,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.162-168, 12 refs.

The distribution of soil bacteria was investigated on twelve soil samples collected from ice-free areas near Showa Station with special reference to the environmental conditions. A wide range of the total number of bacteria in samples from various sites ranged widely from approximately 100 to 10,000,000 per gram soil. Although the environmental conditions of the twelve sampling points differed from each other, two interesting trends were observed between the bacterial flora and their habitats. In general, the abundance of soil bacteria was higher in surface soil covered with macroscopic plant community than in exposed soil. The total number of bacteria, except for a few soil samples near Showa Station, seems to be controlled by soil carbon (organic matter), which differs from the findings of other workers on the soils of the Dry Valleys area, Victoria Land, where the shortage of water limits life. (Auth.)

B-30942

Tsareva, L.D., Kovalev, V.M., Kalinin, I.V., Urusov, G.I., **Use of various working surfaces for processing frozen cooked krill** [Primenenie razlichnykh rabochikh poverkhnosteĭ dlia obrabotki vareno-morozhenogo krilia], *Rybnoe khoziaĭstvo,* Jan. 1984 No.1, p.71-72, In Russian.

Experimental equipment was used to find the most efficient type of working surface for separating the shell from krill in order to obtain maximum yield of product at permissible shell content of less than 0.5%. Best results were achieved with a grater made of reinforced brass belt, with the blade 1 mm high and steps of 2.5 mm. Its use resulted in the highest yield (16.8% in terms of raw material). The optimal rotor rotation velocity was established to be 1500 rev/min, the linear shelling velocity 15.6 m/s, processing time 60 s and impact load 100 g.

B-30964

Landrum, B.J., **Biological services and collections,** *Antarctic journal of the United States,* 1983 18(5), p.294-295.

The Smithsonian Oceanographic Sorting Center's primary goal is to aid researchers by encouraging systematic studies and related analyses of biological collections. In the past year, 920 antarctic samples were processed. Approximately 192,400 specimens were prepared for shipment and storage. 1,182 sorted lots containing about 45,500 specimens were shipped to 26 specialists in 60 shipments. The shipments included large collections of various groups of pelagic copepods, oplophorid shrimps and siphonophores. Steps being taken to further expedite analyses of the remaining material are outlined. The collections are being prepared for a forthcoming move of the Sorting Center to a new laboratory and storage facility constructed by the Smithsonian Institution in Silver Hill, Maryland.

B-30975

Laws, R.M., ed, **Antarctic ecology,** London, Orlando, Academic Press, 1984, 850p. (2 vols.), For individual papers see: 39-1182 through 39-1189 or B-30977 through B-30979, B-30982 through B-30990, E-30980, I-30976 and J-30981. Numerous refs.

DLC QH84.2.A58 1984

The origin of these volumes is traced to SCAR Symposia on Antarctic Biology in 1962 (1B-1463), 1968 (5B-8120 and 5B-8534), and 1974 (7B-1319 [abstrs.] and 9B-19172). A fourth symposium met in 1983. The present volumes represent an update of the 1968 meeting. In fifteen chapters research progress is reviewed in specific areas. These include: the terrestrial environment; terrestrial plant biology; terrestrial microbiology, invertebrates, and ecosystems; introduced mammals; inland waters; the marine environment; the marine flora; marine benthos; marine zooplankton; fish; seabirds; seals; whales; marine interactions; and conservation and the Antarctic.

B-30977

Smith, R.I.L., **Terrestrial plant biology of the sub-Antarctic and Antarctic,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.61-162, Bibliography p.139-162.

DLC QH84.2.A58 1984

This account presents a comprehensive overview of the macroscopic terrestrial vegetation and plant biology of the sub-Antarctic and Antarctic biome, and provides a synopsis of the main plant ecological and related investigations. No attempt has been made to review taxonomic literature or to draw comparisons with the sub-Arctic and Arctic biome. Also, due to length limitation, there is little interpretive discussion. (Auth.)

B-30978

Block, W., **Terrestrial microbiology, invertebrates and ecosystems,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.163-236, Bibliography p.216-236.

DLC QH84.2.A58 1984

This contribution reviews the microbiology and the invertebrates of terrestrial communities throughout the Antarctic region and considers the variety of environmental adaptations which have evolved there. In particular, an examination is made of the mechanisms which produce invertebrate cold hardiness, and of the information available on terrestrial ecosystem structure and function. It is concluded that many of the adaptational features observed are peculiar to low temperature organisms, which combined with the particular trophic organization of antarctic terrestrial communities, have resulted in the development of ecosystems which are unique on this planet. (Auth.)

B-30979

Bonner, W.N., **Introduced mammals,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.237-278, Bibliography p.273-278.

DLC QH84.2.A58 1984

The primary species introduced to sub-antarctic and antarctic regions are composed of black rats, brown rats, domestic mice, cats, rabbits and reindeer. The sub-Antarctic islands have been exposed to the influence of man for only about 200 years, yet in that time many of them have been greatly affected by introduced species. Some of the consequences of these introductions to both flora and fauna are described in case studies. (Auth. mod.)

B-30982

Heywood, R.B., Whitaker, T.M., **Antarctic marine flora,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.373-419, Bibliography p.411-419.

DLC QH84.2.A58 1984

The authors conclude that primary productivity in antarctic waters is no greater than any other waters of the earth except the Arctic regions. They review major studies on the various aspects of the question. They examine floral species distribution and habitats including diatoms, dinoflagellates, shelf- and ice-dwellers, and bottom dwellers living in a rain of fecal pellets. They review factors affecting species physiology: nutrient supply, temperature, light, and water column stability. They urge better measurements of chlorophyll *a*, the standard by which total production is gauged.

B-30983
White, M.G., **Marine benthos,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.421-461, Bibliography p.454-461.

DLC QH84.2.A58 1984

In reviewing prior and on-going research, several aspects provide convenient groupings for describing present knowledge of the bottom dwellers. These include the biomass, density (abundance), diversity, origins of the various populations and their circulation into zoned distribution patterns, and associations/compatibilities between the various zones. Sub-ice ecologies are discussed and it is concluded that the substantial group of adaptations which seemingly are responses to the cold, do, in fact, result from an overall reduction in energy utilization as a method of survival in a cold, highly seasonal antarctic marine ecosystem.

B-30984
Everson, I., **Zooplankton,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.463-490, 48 refs.

DLC QH84.2.A58 1984

It is estimated that the annual primary production south of the Antarctic Convergence is around 610 million tons. This large amount of phytoplankton in turn serves to maintain the large and diverse zooplankton communities. The literature on Southern Ocean zooplankton is dominated by studies on a single species, *Euphausia superba,* the antarctic krill, which as well as being of enormous interest ecologically is also a resource of considerable commercial potential. In spite of this there is some evidence to suggest that other species or groups, such as the copepods, are as significant in the ecosystem in terms of biomass and production although, because of their supposed lesser importance to higher predators and their lack of commercial potential, they have received less attention. (Auth.)

B-30985
Everson, I., **Fish biology,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.491-532, 85 refs.

DLC QH84.2.A58 1984

The review analyzes the research literature of the 120 species of fish found south of the Antarctic Convergence, most of them being found exclusively there. The survey is organized on the basis of species composition and distribution; size and growth; reproduction; food; seasonal cycles; cold adaptations; biomass and production; and economic exploitation.

B-30986
Croxall, J.P., **Seabirds,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.533-619, Bibliography p.601-616.

DLC QH84.2.A58 1984

With the vast extent of ocean and small area of ice- and snow-free land in Antarctic and sub-Antarctic regions it is hardly surprising that nearly all the birds of these areas should be seabirds. Furthermore they chiefly belong to the two most marine-adapted of all groups, the procellariforms (albatrosses, petrels, etc.) and penguins. After reviewing the species involved and their distribution patterns, a brief summary is given of the main features of penguin and petrel breeding cycles with special reference, wherever possible, to work concluded since 1970. In general and for selected species these can then be evaluated with reference to food and feeding ecology and population structure and dynamics. Finally, energetic requirements and the possible level of impact of seabird populations on Antarctic marine living resources is discussed. (Auth.)

B-30987
Laws, R.M., **Seals,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.621-715, Bibliography p.705-715.

DLC QH84.2.A58 1984

The circumpolar zone of fast ice and pack ice is a barrier to some seal species, although all six Antarctic seals have been recorded in it, but it also provides a platform on which they haul out. Although few in number of species (six out of 36 pinniped species), each species represents a separate genus (six out of 19 world wide) and several are very abundant. One, the crabeater seal, *Lobodon carcinophagus,* comprises at least half the total world stocks of pinnipeds. As a group it has been estimated that they amount to about 56% of the world stocks and, because individuals tend to be larger than other seals, about 79% of the total biomass of pinnipeds. However, population increases in the last decade suggest that they may account for considerably more than these proportions. Their importance cannot be denied, both on account of their basic scientific interest, as a basis for former industries and as a potential future resource. Furthermore, a number of the more significant developments in marine mammal and more general mammalian studies owe much to the results of research on antarctic seals, for example in age determination, reproduction, population dynamics, behavior and diving physiology. (Auth.)

B-30988
Brown, S.G., Lockyear, C.H., **Whales,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.717-781, Bibliography p.773-781.

DLC QH84.2.A58 1984

Seven species or subspecies of Mysticete (baleen or whalebone) whales and eight species or subspecies of Odontocete (toothed) whales occur in waters south of the Antarctic Convergence. Six of the baleen whales belong to the family Balaenopteridae (rorquals). There is no evidence that the other southern hemisphere rorqual, Bryde's whale occurs in Antarctic waters, nor is there confirmed record of the Pygmy right whale south of the Antarctic Convergence, though it has been recorded from the Falkland Islands. Research literature on both categories of whales is reviewed on specific aspects of these largest of all creatures. Specific discussion aspects include: feeding methods/preferences/quantities/cycles; annual behavior cycles; migrations; geographic distribution; feeding zones; growth and age; breeding and reproduction; energy expended; and populations and methods of counting. (Auth. mod.)

B-30989
Everson, I., **Marine interactions,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.783-819, 27 refs.

DLC QH84.2.A58 1984

Extrapolations and, in many cases, almost total lack of information in previous works on the antarctic ecosystem highlighted how little was known in quantitative terms of ecosystem interactions. More recently models have been devised which attempt to quantify the effects of simultaneous krill and whale fisheries upon each other. The developments come at a time when there is a pressing need for information on which to devise plans for rational management of resources. The need for these studies should not be restricted simply to exploited or potentially exploitable resources but extended to all elements of the ecosystem, because unexploited components may themselves be sensitive indicators of change and also for the reason that insufficient is known or understood about the functioning of ecosystems in general. This chapter is therefore divided into three sections. The first deals with the major food chain relationships so as to highlight the magnitude of production by different trophic levels. The second discusses the current models in terms of their database and their predictive application as management tools. This leads into the final section which deals with identifying local interactions which might provide further insight into ecosystem functioning and greater refinement of the models. (Auth.)

B-30990

Bonner, W.N., **Conservation and the Antarctic,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.821-850, 64 refs.

DLC QH84.2.A58 1984

The author prefers the definition in which conservation is a planned management tool to control the exploitation of natural resources; emphasizes the special ecological position of the Antarctic; points out that potential threats to natural systems are commercial exploitation, introduced species, and pollution in various forms. A history of unmanaged exploitation is given in the sealing and whaling operations of the 19th and 20th centuries. Even antarctic expeditions adversely affect the environment: specimen collections; killing penguins and seals as food for men and sledge dogs; base installations. The Antarctic Treaty and agreed measures were devised and accepted to minimize anthropogenic effects on the environment.

B-31008

Clarke, A., **Life in cold water: The physiological ecology of polar marine ectotherms,** Oceanography and marine biology; an annual review, Vol.21, edited by M. Barnes., Aberdeen, Scotland, University Press, 1983, p.341-453, Bibliography p. 442-453.

DLC GC1.032

The review covers physiological studies of polar marine organisms and contrasts these with a selection of acclimation studies which focus on key aspects of low temperature biology. After an historical introduction, the first section deals with the physics of cold water, followed by a discussion of how proteins adapt to low temperature. This leads to a consideration of protein synthesis and metabolism, and a review of the lipid biochemistry of polar organisms. The final section is an attempt to link the physiology and ecology of living in cold water. Organisms inhabiting both Arctic and Antarctic marine environments are considered in this review. (Auth.)

B-31014

IAkovlev, S.N., **Reproductive cycle of antarctic sea urchin *Sterechinus neumayeri* in Davis Sea,** *Soviet journal of marine biology,* Sept.-Oct. 1983 (Pub. July 1984) 9(5), p.265-270, Translated from Biologiia moria. 15 refs.

Histological changes in the gonads of antarctic ordinary sea urchin *Sterechinus neumayeri* were studied. From January to March postspawning reorganization is observed in its gonads, from March to July gametes develop for reproduction, and from July to January the sea urchins are in a spawning state. The period of reproduction in these sea urchins is longer than in those from temperate waters. Oocyte growth of *S. neumayeri* takes one year and the 18-24-month period of duration of oocyte growth in this species reported by others may be erroneous. (Auth.)

B-31016

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **BIOMASS executive. Report of the second 1984 meeting, Bremerhaven, F.R.G., 2-3 October 1984,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Dec. 1984 No.39, 8p.

The Fish Ecology Working Party and Bird Ecology Working Party meetings, held in France in August 1984 and in Germany in September 1984, respectively, are reviewed. The report on the Workshop on Post-FIBEX Data prepared for the BIOMASS executive meeting is discussed, pointing out that the new figures reported for krill biomass in the FIBEX areas should be interpreted with caution. The third meeting of the Scientific Committee of CCAMLR is reviewed, establishing that two measures to reduce the pressure on the fish stocks, mesh size regulation and closure of a 12-mile zone around South Georgia, were agreed upon. Plans for future meetings are outlined, and BIOMASS publications, finances, and database are discussed.

B-31023

Burckle, L.H., **Ecology and paleoecology of the marine diatom *Eucampia antarctica* (Castr.) Mangin,** *Marine micropaleontology,* July 1984 9(1), p.77-86, Refs. p.85-86.

The distribution of *Eucampia antarctica,* both in the water column and in the sediments of the southern ocean, is discussed. On the basis of these data, it is concluded that, although this species is widely distributed in the southern ocean, it is most abundant in a near shore and/or neritic environment. However, a pseudoneritic environment, provided by floating ice may also provide a suitable substrate for the proliferation of this species. (Auth.)

B-31034

Blankley, W.O., **Ecology of the starfish *Anasterias rupicola* at Marion Island (Southern Ocean),** *Marine ecology progress series,* June 28, 1984 18(1-2), p.131-137, 14 refs.

The starfish *Anasterias rupicola* (Verrill) is the most conspicuous littoral macro-invertebrate predator at Marion Island. It tends to congregate in relatively sheltered sites. Its diet is recorded from 404 cases of predation, 40% of which occurred on the limpet *Nacella delesserti.* Two other important prey are the polychaete *Platynereis australis* and the isopod *Dynamenella huttoni.* *A. rupicola* may feed either as solitary individuals or clustered together in groups on single prey. Solitary starfish are limited to capturing prey smaller than themselves. It is suggested that *A. rupicola* takes at least 39 years to attain its maximum diameter of 110 mm. Intertidal *A. rupicola* are preyed on by the lesser sheathbill *Chionis minor* and the kelp gull *Larus dominicanus.* (Auth.)

B-31035

Oliver, J.S., **Selection for asexual reproduction in an Antarctic polychaete worm,** *Marine ecology progress series,* Aug. 30, 1984 19(1-2), p.33-38, 17 refs.

The antarctic oweniid polychaete *Myriochele cf. heeri* frequently reproduced asexually by binary fission. The frequency of asexual reproduction was related to size-selective mortality and was highest in a constant physical environment where the important potential selective forces are biological. Asexual individuals were abundant in a dense assemblage of antarctic infauna. Individuals produced by fission had a size refuge from all important sources of mortality, especially crustacean predators that kill the larvae and juveniles of other soft-bodied infauna. Asexual reproduction was rare in antarctic habitats where larval invasion was more likely and there was little refuge in size from various sources of adult mortality. (Auth.)

B-31052

Efremenko, V.N., **Larvae of the family Nototheniidae from the Scotia Sea,** *Journal of ichthyology,* 1984 24(1), p.34-43, Translated from Voprosy ikhtiologii. 16 refs.

A morphological description is given of the larvae of 10 species and subspecies of the family Nototheniidae: *Notothenia nudifrons, N. corriceps neglecta, N. squamifrons atlantica, Patagonotothen guentheri shagensis, Trematomus scotti, T. eulepidotus, T. hansoni, T. loennbergii, T. newnesi and Aethotaxis mitopteryx,* and their distribution in the Scotia Sea is shown. (Auth.)

B-31053

Nishimura, K., Kawamura, Y., Matoba, T., Yonezawa, D., **Classification of proteases in antarctic krill,** *Agricultural and biological chemistry,* Nov. 1983 47(11), p.2577-2583, 30 refs.

DLC QH345.A35

The species of endogenous proteases in antarctic krill, *Euphausia superba*, were investigated using the homogenate of krill and the active fractions after gel filtration of the homogenate as to the following criteria: Substrate specificity, sensitivity to protease inhibitors, molecular weight and isoelectric point. Results show that the carboxypeptidase A and B, aminopeptidase, trypsin and cathepsin A types of proteases were present in krill. (Auth.)

B-31054

Kobori, H., Sullivan, C.W., Shizuya, H., **Bacterial plasmids in antarctic natural microbial assemblages,** *Applied and environmental microbiology,* Sept. 1984 48(3), p.515-518, 18 refs.

Samples of psychrophilic and psychrotrophic bacteria were collected from sea ice, seawater, sediments, and benthic or ice-associated animals in McMurdo Sound, Antarctica. A total of 155 strains were isolated and tested for the presence of plasmids by DNA agarose gel electrophoresis. Thirty-one percent of the isolates carried at least one kind of plasmid. Bacterial isolates taken from sediments showed the highest plasmid incidence (42%), and isolates from seawater showed the lowest plasmid incidence (20%). Plasmids were significantly more frequent in the strains which had been first isolated from low-nutrient media (46%) than in the strains which had been isolated from high-nutrient media (25%). Multiple forms of plasmids were observed in two-thirds of the plasmid-carrying strains. A majority of the plasmids detected were estimated to have a mass of 10 megadaltons or less. Among 48 plasmid-carrying strains, 7 showed antibiotic resistance. It is concluded that bacterial plasmids are ubiquitous in natural microbial assemblages of the pristine marine ecosystem of Antarctica. (Auth.)

B-31055

Smith, V.R., **Effects of abiotic factors on acetylene reduction by cyanobacteria epiphytic on moss at a subantarctic island,** *Applied and environmental microbiology,* Sept. 1984 48(3), p.594-600, 39 refs.

Acetylene reduction (AR) rates by cyanobacteria epiphytic on a moss at Marion Island increased from -5 C to a maximum at 25 to 27 C. Q10 values between 0 and 25 C were between 2.3 and 2.9, depending on photosynthetic photon flux density. AR rates declined sharply at temperatures above the optimum and were lower at 35 C than at 0 C. Photosynthetic photon flux density at low levels markedly influenced AR. Higher photosynthetic photon flux density levels decreased AR rates. Ar increased up to the highest sample moisture content investigated (3,405%), and the pH optimum was between 5.9 and 6.2. The addition of P, Co, and Mo, individually or together, depressed AR. (Auth.)

B-31056

Maxson, S.J., Bernstein, N.P., **Breeding season time budgets of the Southern Black-backed gull in Antarctica,** *Condor,* Nov. 1984 86(4), p.401-409, 15 refs.

Southern Black-backed, or Kelp, Gulls *(Larus dominicanus)* were studied at Palmer Station, Antarctica during two breeding seasons to document the role of each sex in the reproductive effort and to determine how these gulls have adapted their behavior to the antarctic environment. The breeding colony was small (19 pairs) and gulls defended a shoreline feeding territory adjacent to their nest site. During all stages of the breeding cycle, both sexes were inactive during most of the time they were on territory. While producing eggs, females spent more time inactive than their mates. Females spent more time incubating (59.3% vs. 40%) than males. As chicks demanded more food, parents spent more time (up to 69%) foraging off territory. Males played a more active role than their mates in territory defense. Agonistic behaviors were more frequent in the "high" density area of the colony. Both sexes spent a high proportion of time (up to 86%) near (within 5 m) the nest during laying and incubation periods. This proportion dropped steadily through the chick rearing period to a low of 13% as chicks neared fledging. (Auth. mod.)

B-31058

Alvariño, A., Wojtan, J.M., **Three new species of *Lensia*, and description of the eudoxia stages of *Lensia reticulata* and *Lensia lelouveteau* (Calycophorae: Siphonophorae),** *Biological Society of Washington. Proceedings,* June 14, 1984 97(1), p.49-59, 11 refs.

Three new species of *Lensia* are described and illustrated: *L. eugenioi, L. eltanin* and *L. lendrumae.* Their diagnostic characteristics are discussed and compared with those of other closely related species of *Lensia.* The previously unknown eudoxid stages of *L. reticulata* Totton, 1954 and *L. lelouveteau* Totton, 1941 are described and illustrated. The specimens were observed in plankton collections obtained during the USA Antarctic Research Program. (Auth.)

B-31063

Minichev, IU.S., **Morphology of the pelagic molluscs *Pneumodermatidae (Opisthobranchia, Gymnosomata)* from antarctic waters** [K morfologii pelagicheskikh molliuskov *Pneumodermatidae (Opisthobranchia, Gymnosomata)* iz antarkticheskikh vod], *Akademiia nauk SSSR. Zoologicheskiĭ Institut. Issledovaniia fauny moreĭ,* 1976 18(26), p.102-106, In Russian with English summary. 8 refs.

DLC QL121.A1A5

Pelagic molluscs from the Antarctic are described. *Platybrachium antarcticum* gen. et sp. nov. is characterized by two very broad sucker arms and absence of lateral and posterior gills. One rudimentary median sucker arm and two well developed lateral arms, and a pigmentory section of skin in place of a lateral gill are typical of *Pneumodermopsis brachialis* sp. n. The morphology of *Pneumodermatidae* is analysed. (Auth.)

B-31064

El-Sayed, S.Z., ed, **Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS newsletter, Vol.6, No.2,** College Station, Texas A and M University, Dec. 1984, 12p.

Included in this issue are reports on: the BIOMASS executive meeting and the 18th SCAR meeting held in Bremerhaven for discussions on the establishment of *ad hoc* groups on fish stock assessment and on ecosystem monitoring and management, and the organization of a workshop on krill stock assessment; activities of the SCAR biology working group; the working party on fish ecology meeting in Dammaries-les-Lys, discussing results from fish investigations during SIBEX 1983-1984, the Species Identification Sheets, and the Atlas of Antarctic Fish Otoliths; the bird ecology working party meeting in Marburg, discussing the report on the preparations for the Post-FIBEX Seabird Data Workshop; the Post-FIBEX Acoustic Workshop meeting in Frankfurt, discussing acoustic data from nine participant nations, with one observer, on the recalculation of krill biomass; the plans for Weddell Sea winter studies; three book reviews, and one *in memoriam* for Sir George Deacon.

B-31065

Block, W., **Low temperature tolerance of soil arthropods. Some recent advances,** International Soil Zoology colloquium, 8th, Louvain-la-Neuve, Belgium, Aug. 30-Sep. 2, 1982. Proceedings. Edited by Ph. Lebrun et al, Ottignies-Louvain-la-Neuve, Dieu-Brichart, 1983, p.427-431, 12 refs.

Information on the effects of cold and freezing on soil arthropods and on their cold resistance mechanisms is reviewed. Recent studies on selected arctic and antarctic species is summarised comparatively. The occurrence of two survival strategies (freezing susceptible and freezing tolerant) is discussed, and the importance of an ecophysiological approach in such studies is emphasized. (Auth.)

B-31066

Wynn-Williams, D.D., **Microflora-microfauna interactions in antarctic moss peat decomposition processes,** International Soil Zoology Colloquium, 8th, Louvain-la-Neuve, Belgium, Aug. 30-Sept. 2, 1982. Proceedings. Edited by Ph. Lebrun et al, Ottignies-Louvain-la-Neuve, Dieu-Brichart, 1983, p.237-246, Includes discussion. 15 refs.

In two consecutive years at Signy Island, maritime Antarctic, a spring peak of respiratory activity was observed during the decomposition of freshly-sampled intact peat cores from moss communities. The peak was followed by a sharp decline within 1-2 weeks. The composition of the microflora changed concurrently, a decrease in yeast numbers being conspicuous. Although the availability of soluble nutrients is probably the prime factor affecting this decline, predation of microorganisms by invertebrates is thought to be contributory. Simulations *in vitro* of such microbe-microfauna interactions in intact peat cores support this hypothesis. (Auth.)

B-31067

O'Reilly, J.E., Thomas, J.P., **Manual for the measurement of total daily primary productivity,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS handbook,* 1983 No.10, 70p., Refs. p.62-65.

This manual describes the following: the BIOMASS method for making shipboard measurements of total daily phytoplankton primary productivity using C-14 simulated *in situ* sunlight incubations of water collected throughout the euphotic layer; the flow of activity from collecting samples and recording data at sea, through C-14 incubation, filtration, liquid scintillation counting, and computer processing primary productivity data; and details for building the special field equipment used.

B-31080

Voronina, N.M., **Pelagic ecosystems of the southern ocean** [Ekosistemy pelagiali IUzhnogo okeana], Moscow, Nauka, 1984, 206p., In Russian. Refs. p.187-204.

An extensive literature review is presented in the six chapters of this book, five of which deal with the history and methods of investigation, characteristics, seasonal cycles and ecology of plankton of the southern ocean and its pelagic communities. Chapter six is dedicated to mathematical modeling of plankton studies in the Antarctic. Estimates of yearly primary production and krill population are included.

B-31082

Shust, K.V., Parfenovich, S.S., Gerasimchuk, V.V., **Antarctic silver fish *(Pleuragramma antarcticum boulenger)* distribution in relation to oceanological conditions of habitat and biology** [Raspredelenie antarkticheskoĭ serebrianki *(Pleuragramma antarcticum boulenger)* v sviazi s okeanologicheskimi usloviiami ee obitaniia i osobennostiami biologii], *Voprosy geografii,* 1984 Vol.125, p.193-200, In Russian. Numerous refs. at end of journal.

The geographic distribution, population, ecology and eating habits of the antarctic silver fish *(Pleuragramma antarcticum boulenger)* of the Nototheniidae family are reported. The population area includes shelf and upper slope of the antarctic continent and islands to the south of 60 S. Its habitat is characterized by homogeneous hydrological conditions: water temperature ranges from -0.5 to 2.0 deg C, salinity from 34.0 to 34.6 ppt, and oxygen concentration from 6.0 to 8.0 ml/l. The fish is found at a depth of 80 m, where closed cyclonic circulation patterns are typical. The most intensive feeding period for the antarctic silver fish occurs during the fall when its prey descends to the bottom.

B-31084

Wells, R.M.G., Tetens, V., DeVries, A.L., **Recovery from stress following capture and anaesthesia of antarctic fish: haematology and blood chemistry,** *Journal of fish biology,* Nov. 1984 25(5), p.567-576, 29 refs.

Qualitative changes in haematology and blood chemistry of the giant antarctic cod, *Dissostichus mawsoni,* were followed during recovery from the stresses of capture and cannulation under MS 222 anaesthesia. Cannulation with anaesthesia resulted in a transient rise in haematocrit and haemoglobin concentration, and a fall in blood pH. These changes returned to stable values 8-24 hours later. Blood lactate and mean corpuscular haemoglobin concentration remained near to resting values. Severe stress resulted in a more marked increase in haemoglobin and haematocrit and decrease in pH. Moreover, the erythrocytes appeared swollen and blood lactate was appreciably elevated. The blood profile returned to stable values some 24 to 70 hours after capture. Changes in blood ATP were noted in severely stressed fish. Experiments with the smaller nototheniid species, *Pagothenia borchgrevinki,* indicated that erythrocyte swelling, elevated blood lactate, and changes in ATP concentration were delayed manifestations of severe agitational stress. The significance of these findings is discussed in relation to oxygen transport in fish having low metabolic rates, and also in relation to widely used techniques for sampling blood. (Auth.)

B-31086

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Meeting of BIOMASS Working Party on Bird Ecology,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Dec. 1984 No.41, 42p.

The meeting held in Marburg, West Germany, on Sept. 20-22, 1984, is reported. The discussion covers the progress of the following initiatives: computerization of data on the location, status and size of breeding colonies of penguins; handbooks on identification of fish remains in predator stomachs, of squid beaks, and of crustacean remains in predator stomachs; satellite remote sensing; CCAMLR request regarding seabirds as indicator species and monitoring studies; recording methods for seabirds at sea and methods for counting and monitoring them; compilation of weight data on antarctic seabirds; bibliographies of penguins and albatrosses; proposed bibliography of diet studies on antarctic seabirds; central databank for bird banding; inventory of color banding project; the Post-FIBEX seabird data workshop; the future direction of BIOMASS and WPBE; the Working Party publications and budget for 1985. A summary of recommendations is presented.

B-31090

Burn, A.J., **Life cycle strategies in two antarctic Collembola,** *Oecologia,* 1984 64(2), p.223-229, 23 refs.

Populations of two coexisting Antarctic Collembola were studied in the field and under constant conditions in the laboratory to determine their life cycles and to compare their energy utilization. In the field *Parisotoma octooculata* completes three to four moults during summer. Maturity is reached in the second year. *Cryptopygus antarcticus* has many overlapping generations, maturity is achieved in the third year. In the laboratory *P. octooculata* has a faster rate of growth than *C. antarcticus* under constant conditions of temperature and humidity. Analysis of gut contents showed that the two species overlapped in their food range; the faster growth of *P. octooculata* being achieved by a faster consumption rate. The slower growth rate of *C. antarcticus* may not result from limited food availability, but from a better life cycle strategy for unpredictable environmental conditions. *P. octooculata*, which shows features more characteristic of temperate Collembola, may be a more recent Antarctic colonist. (Auth.)

B-31091

Usher, M.B., Edwards, M., **Terrestrial arthropods of the grass sward of Lynch Island, a specially protected area in Antarctica,** *Oecologia,* 1984 63(1), p.143-144, 9 refs.

The small island, measuring about 500 m across and rising to a height of 33 m, supports one of the most extensive and dense swards of *Deschampsia antarctica* known in Antarctica. Nothing seems to have been published about the arthropods of the island. The island was visited by permit on 25 February 1981 to survey the arthropods of the unusual *Deschampsia* community. To minimize disturbance only 6 soil cores were cut from random points in the *Deschampsia* sward. Thirteen species of arthropods were extracted from the 6 cores. Tables of population statistics for various depths are presented.

B-31095

Trivelpiece, W.Z., Trivelpiece, S.G., Volkman, N.J., **Further insights into nest-site competition between Adélie and Chinstrap penguins,** *Auk,* Oct. 1984 101(4), p.882-884, 7 refs.

The authors suggest that Chinstraps are able to displace Adélies partially because of the asynchrony of the breeding cycles of the two species; male Chinstraps, arriving fresh from the sea, compete with incubating Adélie males that had been fasting for 3 weeks. They further attribute the competition to population increases in both species and suggest that the peak competition lay between young inexperienced Adélies nesting on the edge of the colony in territory regarded by the Chinstraps as their own.

B-31096

Adams, N.J., **Utilization of a squid diet by adult King penguins *(Aptenodytes patagonicus)*,** *Auk,* Oct. 1984 101(4), p.884-886, 18 refs.

This study presents the first measurements of the assimilation efficiency of a predominately squid-eating adult seabird fed on squid. The study was conducted at subantarctic Marion Island during September 1981 and April 1982. The calculated utilization efficiency of captive adult birds is near the upper limits of the range observed for young piscivorous seabirds fed on fish. (Auth.)

B-31097

Booth, R.G., Usher, M.B., **Arthropod communities in a maritime antarctic moss-turf habitat: effects of the physical and chemical environment,** *Journal of animal ecology,* Oct. 1984 53(3), p.879-893, 22 refs.

From 384 samples of Signy Island moss and peat, arthropods were extracted and counted and the following environmental variables were measured: dry weight, percentage of water content, *Polytrichum* cover, pH, and the concentrations of sodium, potassium, calcium, phosphorus and nitrogen. Relationships were established between these measured variables and arthropod concentrations to determine the impact each had on the animal populations. Although some physical environmental variables affected the arthropod concentrations in the green moss zone, overall it was the chemical characteristics of the environment which most influenced arthropod distribution. (Auth. mod.)

B-31118

Morris, D.J., Priddle, J., **Observations on the feeding and moulting of the antarctic krill, *Euphausia superba* Dana, in winter,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.57-63, 22 refs.

During the latter part of the austral winter of 1983, levels of plant pigment in the alimentary tract and the moult stage of krill were assessed around South Georgia and off Elephant Island. Data suggest a decrease in moulting activity, although the proportion of krill assessed as moulting in the later part of the sampling period approximated to that observed in summer. A smaller proportion of the krill was feeding on phytoplankton in winter than in summer. This is partly explained by a reduction in feeding activity and partly by an increase in the depth range occupied by krill. During the study period, there was an increase in the proportion of krill feeding, associated with an increase in both the depth range and biomass of the phytoplankton. The winter phytoplankton was characterized by a uniform species composition and a homogeneous vertical distribution. (Auth. mod.)

B-31119

Hemmings, A.D., **Aspects of the breeding biology of McCormick's skua *Catharacta maccormicki* at Signy Island, South Orkney Islands,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.65-79, 33 refs.

During the 1982-83 season nine pairs of *Catharacta maccormicki* (and 143 pairs of *C. lonnbergi)* bred. McCormick's skua bred two weeks later than the brown skua and, as elsewhere where the two are sympatric, foraged at sea rather than in penguin colonies. The Signy population of *C. maccormicki* is similar to continental populations in nest dispersion, egg size, hatching interval, duration of incubation and rearing periods and chick growth. However, it showed very significantly greater breeding success due to the very high survival of the second chicks of broods, despite some evidence of sibling aggression. From analysis of the food samples, the fish *Pleuragramma antarcticum* was the main prey, and it is presumed that this species, which is not taken by other seabirds or seals at Signy, is sufficiently abundant to permit the skuas to fledge both chicks. As elsewhere in the area of sympatry with *C. lonnbergi,* a small number of mixed pairs occurred. (Auth.)

B-31120

Westermann, J.E.M., Barber, D.L., Malo, L.G., **Observations on gills of pelagic and demersal juvenile *Notothenia rossii*,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.81-89, 18 refs.

The gills of pelagic, blue-phase fingerling and demersal, juvenile *Notothenia rossii marmorata,* an antarctic teleost sampled at the island of South Georgia were compared using light microscopy. The epithelium of the filament in demersal juveniles was thicker and contained more numerous and larger chloride and mucous cells. In juveniles, the lamellar epithelium was at least two cells thick and contained some mucous cells; fingerlings showed only a single layer of epithelial cells in the lamella. However, melanocytes were present under the epithelium of the filament in the fingerlings, but not in the juveniles. Abundant eosinophils and occasional rodlet cells were seen in the filaments of the juveniles only. There were no evident histological or morphometric specializations that could be related to the Antarctic environment. (Auth. mod.)

B-31121

Cowling, A.J., **Application of gradient diver microrespirometry to protozoan studies,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.91-107, Refs. p.106-107.

The techniques of gradient diver micro-respirometry, developed by Nexo, Hamburger and Zeuthen (1972), are evaluated for the purpose of their application to respiration studies of small Protozoa, particularly antarctic testate amoebae. The method relies on measurements of the downward migration of ampulla divers in an aqueous linear density gradient. Basic techniques, together with modifications developed from experiments with *Tetrahymena pyriformis* (a ciliate) and *Corythion dubium* (a testacean), are detailed. Sufficiently small divers are required for adequate sensitivity, and a standardized method of culture contaminant removal is required when dealing with non-axenic protozoans. (Auth.)

B-31123

Filson, R.B., ***Xanthoria elegans* and its synonyms in Antarctica,** *Lichenologist,* 1984 16(3), p.311-312, 6 refs.

A variety of names for *Xanthoria elegans,* and their type, history and location where they were first seen, is presented. The morphological features of the different genera are discussed.

B-31124

Allahpichay, I., Shimizu, C., Kono, M., **Pigmentation of cultured red sea bream, *Chrysophrys major,* using astaxanthin from antarctic krill, *Euphausia superba,* and a mysid, *Neomysis* sp.,** *Aquaculture,* Apr. 15, 1984 38(1), p.45-57, Refs. p.56-57.

Pigmentation enhancement in cultured red sea bream *Chrysophrys major* was investigated using antarctic krill, *Euphausia superba,* and a mysid, *Neomysis* sp., as a source of astaxanthin. Diets fortified with krill meal and krill's extract, containing 0.82-4.92 mg carotenoids/100 g dry weight, and raw krill and raw mysid supplemented diets, containing about 2.00 mg carotenoid/100 g wet weight, were formulated and tested for carotenoid deposition. The rate of carotenoid deposition in fish fed with raw krill and raw mysid was significantly higher and resulted in distinct pigmentation. The groups fed with the krill meal and acetone extract diets showed varied concentrations of skin carotenoids and resulted in faint pigmentation. (Auth.)

B-31125

Zdzitowiecki, K., **Antarctic acanthocephalans of the genus *Metacanthocephalus,*** *Acta parasitologica polonica,* Dec. 30, 1983 28(44), p.417-437, With Polish summary. 6 refs.

Study of 2066 acanthocephalans collected off the South Shetland Islands, of the 3 species described by Leiper and Atkinson in 1914, is reported. Proboscis length, hook formula, and embryophores are discussed and illustrated for *Metacanthocephalus campbelli, M. rennicki* (with the recognized synonym of *Echinorhynchus debenhami), M. johnstoni* sp. n., and *M. dalmori* sp. n.

B-31126

Guyomard, R., Grévisse, C., Oury, F.X., Davaine, P., **Evolution of genetic variability between and within populations of Salmonidae derived from the same gene pools** [Evolution de la variabilité génétique inter et intra-populations de populations de Salmonidés issues de mêmes pools géniques], *Canadian journal of fisheries and aquatic sciences,* July 1984 41(7), p.1024-1029, In French with English summary. 18 refs.

Through electrophoretic analysis of 14 enzymatic systems corresponding to 31 loci, the change over 6 generations in the intra- and inter-population variability of salmonid populations was studied from the same initial genetic pool. Four collections of brook trout *(Salvelinus fontinalis)* and 5 of brown trout *(Salmo trutta)* from recently acclimatized stocks in the Kerguelen Islands were examined. The heterozygosity level of these populations remained high and corresponded to the levels of variability observed in other polymorphism studies of the same species. In each species, there was a consistent pattern of genetic differentiation with the hydrographic proximity of the populations and with the genetic origin. Within one and the same initial genetic pool, the dendrograms grouped primarily the different ecotypes collected in the same hydrographic system. Thus, these ecotypes seem to result from a behavioral variability within a panmictic population. Establishment of time-genetic distance relationships on the sole basis of electrophoretic data appears unwarranted. (Auth.)

B-31134

Schwarzhans, W., **Paleo-biogeographic analysis of Tertiary fish fauna from New Zealand and southern Australia** [Paläobiogeographische Analyse der tertiären Fischfauna von Neuseeland und Süd-Australien], *Geologische Rundschau,* May 1981 70(2), p.596-610, In German with English, French and Russian summaries. 20 refs.
DLC QE1.G4917

Faunistic movements of bony fishes are investigated during the Tertiary of the Australian/New Zealandian region and are interpreted in respect to the disconnection of Australia and Antarctica and the initiation and development of the circumantarctic current. The postulation of a colder current side branching from the circumantarctic current and running northwards along the south-eastern coast of New Zealand is made. The evolution of the relatively uniform southern ocean meso- and bathypelagic fauna is discussed as a function of the development of the southern temperate climatic zone and the initiation of the circumantarctic current. Faunistic elements of these affinities are recognizable since at least Lower Miocene. A number of selected ichthyological data, recent and fossil, are presented on biogeographic maps. (Auth. mod.)

B-31140

Quilty, P.G., **Bajocian bivalves from Ellsworth Land, Antarctica,** *New Zealand journal of geology and geophysics,* 1983 26(4), p.395-419, Refs. p.417-418.

Bajocian bivalves are described from 2 localities in the Behrendt Mountains, Ellsworth Land. The fauna consists of 26 species. Only 2 have been formally described previously, 7 are described as new *(Oxytoma trechmanni, Entolium spedeni, Camptonectes robusta, Placunopsis parallela, Pholadomya anterumbonis, Pleuromya latarugata, Pronella antarctica)* and the rest are left in informal nomenclature. *Eocallista* sp., a Late Jurassic form is also described. The fauna is a nearshore marine association lacking *Inoceramus,* and accumulated, as part of a diverse fauna, in quiet conditions in dark siltstone to fine sandstone, perhaps before the onset of a period of major Late Jurassic island arc tectonism. It is dominated by complete, articulated specimens of infaunal genera, particularly *Pleuromya.* (Auth.)

B-31141

Parfenovich, S.S., **Some features of the lateral distribution of antarctic krill aggregations,** *Oceanology,* 1982 22(3), p.356-359, Translated from Okeanologiia. 14 refs.

A full analysis of the spatial distribution of antarctic krill concentration is made on the basis of recent data. The area of their actual occurrence in the southern ocean is shown to be much narrower than the species distribution range and is associated with peculiar features of the large-scale system of water circulation, ice drift and temperature distribution. It is shown that there are specific features in the local distribution of different associations of krill aggregations which predetermine the identification of their isolated regional-genetic types.

B-31142

Mironov, A.N., **Role of Antarctica in the formation of deep-sea fauna of the world ocean,** *Oceanology,* 1982 22(3), p.360-364, Translated from Okeanologiia. 38 refs.

The Oligocene cooling was responsible for the origination in the world ocean of the vertical circulation system associated with the sinking of heavy cold water masses in the Antarctic. Simultaneously, the rates of near-bottom circulation and sedimentation increased, the temperature of deep water decreased and the oxygen concentration in it increased considerably. These changes might have permitted the penetration of many members of shallow-water groups to ocean depths. The most favorable conditions for the colonization of the abyssal zone were formed in the Antarctic. The taxa of antarctic origin constitute a considerable part of the deep-sea bottom fauna. The route of the northward extension of antarctic animals is believed to have changed with time from that along the Pacific coast of America originally to that through the western areas of the Pacific and Atlantic Oceans.

B-31144

Tumantseva, N.I., **Biomass and productive characteristics of protozoan plankton in subantarctic and antarctic waters of the southwestern Pacific,** *Oceanology,* 1982 (Pub. Apr. 1983) 22(5), p.604-608, Translated from Okeanologiia. 18 refs.

Distribution patterns of Ciliophora biomass in different water masses along two meridional sections in the Australian-New Zealand sector of the Pacific Ocean were analysed. Ciliophora abundance was found to vary from 200-500 specimens/1 to 23-47 thousand specimens/1. The biomass per sq. m in the sampled water column was 0.2-3.2 g, varying from 1-2 to 160-180 mg of dry weight per cu. m. The average Ciliophora biomass per sq. m in the 0-75 m layer was 84 and 136 mgC in the subantarctic and antarctic waters, respectively. The comparison of the average values of phytoplankton, bacteria and infusoria production from different water masses shows that infusoria production may constitute 10-32% of the total production of phyto- and bacterioplankton.

B-31145

Beliaev, G.M., Vilenkin, B.IA., **Species diversity of the bottom fauna in deep-sea trenches,** *Oceanology,* 1983 23(1), p.114-117, Translated from Okeanologiia. 15 refs.

In deep-sea trenches (at depths over 6000 m), the relationship between the index of the species diversity of the bottom fauna (D) and the depth (z) can be described by the parabolic equation D=Az(sq)+Bz+C, with a high degree of correlation between the parameters A and B. Two groups of trenches were identified according to the gradient of the values of the defining parameter (A or B). One group included trenches located in the equatorial zone or in the Northern Hemisphere, and the second group, those located in the equatorial zone or in the Southern Hemisphere. It is assumed that the nature of the relationship between D and z can be determined by the degree of manifestation in the faunal elements of antarctic origin. (Auth.)

B-31161

Dieckmann, G., Lange, M., **Biology and structure of sea ice in the eastern and southern Weddell Sea,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.100-105.

A brief overview of the results of ice coring in the Weddell Sea is given. Cores were retrieved by going directly onto the ice from FS *Polarstern* or by helicopter. Temperature and chemical data were obtained but analysis has not been completed. Cruise track chart is provided; a photograph shows the drilling operation; a graph profiles the ice to a depth of 300 cm; and a table summarizes the ice core data.

B-31162

Voss, J., **Distribution and ecology of the macrobenthos in the southern and southeastern Weddell Sea** [Verbreitung und Ökophysiologie des Makrozoobenthos in der südlichen und südöstlichen Weddell See], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.106-115, In German.

Descriptions are given of collecting sediments and the ecological denizens of the benthos using trawls and dredges. The search area lay along the Filchner Ice Shelf edge between 48W and 60W and between 33W and 39W extending from 75.5S to 77.5S. A station list and observational data are included and show station number, location, equipment used, depth and time of search, and bottom composition. Organisms were broadly identified and preserved for further study.

B-31176

Alvariño, A., Frankwick, K.R., ***Heteropyramis alcala* and *Thalassophyes ferrarii*, new species of Clausophyidae (Calycophorae: Siphonophorae) from the South Pacific,** *Biological Society of Washington. Proceedings,* Dec. 29, 1983 96(4), p.686-692, 11 refs.

Two new species, *Heteropyramis alcala* and *Thalassophyes ferrarii,* are described and compared with the other species of their genera, *Heteropyramis maculata* Moser, 1925, and *Thalassophyes crystallina* Moser, 1925. The material was obtained in the plankton collections made in the South Pacific during the U.S. Antarctic Research Program. (Auth.)

B-31177

Quinn, J.F., Jr., **Revision of the Seguenziacea Verrill, 1884 (Gastropoda: Prosobranchia). 1. Summary and evaluation of the superfamily,** *Biological Society of Washington. Proceedings,* Dec. 29, 1983 96(4), p.725-757, Refs. p.750-757.

A summary of the superfamily Seguenziacea is compiled from the literature and unpublished observations, and a complete bibliography is presented. A taxonomic resumé of seguenziacean genera is given. A preliminary classification of the superfamily includes 74 nominal species and subspecies in seven genera and four species-groups within *Seguenzia.* The known characters of the shells and anatomy are reviewed. The superfamily seguenziacea is shown to be distinct from any other known archaeogastropod or mesogastropod superfamily. Contents of the intestine of *Seguenzia* sp. cf. *S. eritima* Verill indicate that *Seguenzia* is a detritivore. *Ancistrobasis* is known from the Eocene, Pliocene, and Recent; *Seguenzia* occurs from the Miocene to the Recent; all other genera are unknown as fossils. (Auth. mod.)

B-31178

Cairns, S.D., **Observations on species of the fossil genus *Axopora* (Coelenterata: Hydrozoa) and its evolutionary significance to the Stylasteridae,** *Biological Society of Washington. Proceedings,* Dec. 29, 1983 96(4), p.758-769, 24 refs.

Two species of *Axopora* are redescribed and the remaining valid species are diagnosed and discussed. Three species are illustrated by scanning electron photomicrographs. Special emphasis is given to the morphology of the gastrostyles, and their supposed homology to those of the stylasterids is discussed. A hypothetical evolutionary scheme is proposed suggesting the evolution of the axoporids from a hydractiniid ancestor by the acquisition of calcification and the transformation of its protective spines to gastrostyles. An ancestor to the axoporids is suggested to have evolved into the stylasterids also, the major changes being the encasement of its gonozooids and dactylozooids in specialized calcareous structures. The Axoporidae is considered to be a family of athecate hydroids with close affinities to the Hydractiniidae and Stylasteridae. (Auth.)

B-31179

Bongers, T., **Revision of the genus *Leptosomatum* Bastian, 1865 (Nematoda: Leptosomatidae),** *Biological Society of Washington. Proceedings,* Dec. 29, 1983 96(4), p.807-855, Refs. p.849-852.

The available type-material of the species of *Leptosomatum* has been studied and compared with the type-species of the genera *Leptosomatides (L. euxinus* Filipjev, 1918) and *Syringonomus (S. typicus* Hope and Murphy, 1959). The character complex present in *L. elongatum,* the type-species of *Leptosomatum,* sharply distinguishes the species of *Leptosomatum* from the genus *Leptosomatides,* hitherto regarded as being related to *Leptosomatum.* The species of *Leptosomatum* can be grouped into three complexes: the monotypic complex *L. kerguelense* Platonova, 1958; the *L. bacillatum*-complex; and the *L. punctatum*-complex. (Auth. mod.)

B-31180

Matteri, C.M., **Synopsis of the Andean-Patagonian, antarctic and subantarctic species of the genera *Bartramia, Bartramidula* and *Conostomum* (Bartramiaceae, Musci)** [Sinopsis de las especies andino-patagónicas, antárticas y subantárticas de los géneros *Bartramia, Bartramidula* y *Conostomum* (Bartramiaceae, Musci)], *Darwiniana,* March 1984 25(1-4), p.143-162, In Spanish with English summary. 23 refs.

A taxonomic and nomenclatural assessment of species of the genera *Bartramia, Bartramidula* and *Conostomum* from the Andean-Patagonian region as well as from antarctic and subantarctic areas is presented, drawing attention to the characters of taxonomic value, both at generic and specific level. Spore morphology observed by SEM proved to be a relevant feature for the distinction of the genera here studied. A short description of the family and a key to all the genera of *Bartramiaceae* found in the region, integrate this study with three previously published papers (Matteri 1968, 1973, 1981). The 3 genera, 8 species and 1 variety are treated in a synoptic style, including keys, brief descriptions with the local synonymy, together with useful taxonomic notes and data on habitat and distribution. (Auth. mod.)

B-31181

Smales, L.R., **Helminth Type-specimens in the South Australian Museum. 2. Acanthocephala and cestoda,** *South Australian Museum, Adelaide. Records,* May 1984 18(19-23), p.493-501, Refs. p.500-501.

Type-specimens of 16 species of Acanthocephala and 80 of Cestoda are cataloged. All except two are from Australian or antarctic hosts. Species are listed alphabetically. Where a name change has occurred, the most recent acceptable name is included. (Auth. mod.)

B-31182

Smales, L.R., **Helminth type-specimens in the South Australian Museum. 3. Trematoda,** *South Australian Museum, Adelaide. Records,* May 1984 18(19-23), p.503-511, Refs. p.510-511.

Type-specimens of 13 spp. of Monogenea and 70 spp. of Digenea are cataloged. All are from Australian or antarctic hosts. Trematode species are listed alphabetically, according to the original name of the genus under either Monogenea or Digenea. Where a name change has occurred the most recent name is included. The hosts are given under the name recorded by the author. (Auth.)

B-31183

Watanabe, T., **Effect of nutritional quality of diets given to broodstock on the verge of spawning on reproduction of red sea brim,** *Japanese Society of Scientific Fisheries. Bulletin,* June 1984 50(6), p.1023-1028, 7 refs.

The percentage of buoyant eggs was improved by supplementing pigments, such as *beta*-carotene and canthaxanthin or astaxanthin, to the diets given to broodstock on the eve of red sea brim spawning. Feeding frozen raw krill also resulted in marked improvement in both the total eggs produced and the percentage of buoyant eggs. The proportion of buoyant eggs was markedly reduced from the original value by replacing cuttlefish liver oil with corn oil. The rate of hatching was not improved by addition of pigments, but abnormality in number and position of oil globules was reduced, and consequently the total number of normal larvae obtained became higher than in the original broodstock. These values were also effectively improved by feeding frozen raw krill, and the percentage of normal larvae obtained from buoyant eggs was elevated from the original value of 51.6% to 91.2%. Replacement of cuttlefish liver oil with corn oil even in a short period during spawning, resulted in lowering these values. (Auth.)

B-31184

Yabu, H., Kawamura, A., **Chromosomes of *Euphausia superba* Dana,** *Plankton Society of Japan. Bulletin,* July 1984 31(1), p.61-63, 2 refs.

The dividing nuclei in the seminal glands of *E. superba* Dana collected in the antarctic ocean were examined to observe the chromosomes. The chromosome number was estimated as $2n = 32$ in spermatocytes and $n = 16$ in spermatogonia. All the chromosomes at metaphase in meiosis I were interstitial cruciate by the formation of one chiasma in each chromosome. (Auth.)

B-31185

Summers, R.W., Grieve, A., **Diet, feeding behaviour and food intake of the upland goose *(Chloëphaga picta)* and ruddy-headed goose *(C. rubidiceps)* in the Falkland Islands,** *Journal of applied ecology,* Dec. 1982 19(3), p.783-804, 33 refs.

The diet of upland and ruddy-headed geese was composed mainly of *Poa annua* and *P. pratensis.* Leaf lengths of *Poa annua/pratensis* eaten on "greens" did not vary seasonally for upland geese and there was no significant difference in lengths taken by ruddy-headed and upland geese in winter. Berries, grass-seeds and green algae were eaten at certain seasons. The two goose species had similar time-activity budgets though the proportion of time allotted to some activities varied seasonally, e.g. in winter a greater proportion of the day was spent grazing compared with summer. The digestive efficiency of a captive upland goose fed on grass pellets was measured directly and indirectly. The two methods gave similar results. (Auth. mod.)

B-31186

Smith, P.J., Francis, R.I.C.C., **Glucosephosphate isomerase polymorphism in New Zealand ling *Genypterus blacodes,*** *Comparative biochemistry and physiology,* 1982 73B(3), p.451-455, 13 refs.

DLC QP1.C68

Cellulose acetate electrophoresis was used to examine a polymorphic enzyme, glucosephosphate isomerase, in liver samples from ling *Genypterus blacodes,* collected within the New Zealand 200 mile exclusive economic zone. *Gpi* gene frequencies, coupled with hydrological information, suggest the presence of a least two genetic subgroups or stocks within the samples. The stocks appear to be isolated by the convergence zone between subtropical water to the north and subantarctic water to the south with an area of stock mixing along the Chatham Rise to the east of New Zealand. (Auth.)

B-31187

Henderson, R.J., Sargent, J.R., Pirie, B.J.S., **Peroxismal oxidation of fatty acids in liver of rainbow trout *(Salmo gairdnerii)* fed diets of marine zooplankton,** *Comparative biochemistry and physiology,* 1982 73B(3), p.565-570, Refs. p.570.

DLC QP1.C68

Cyanide-insensitive palmitoyl CoA oxidation was measured in the peroxisomal fraction of the livers of rainbow trout fed either calanoid copepods, krill or a synthetic control diet. The peroxisomal palmitoyl CoA oxidizing activity in livers was not influenced by either the total lipid content or the 22:1 (n-11) fatty alcohol and fatty acid content of the diets. 22:1 (n-11) fatty alcohols and fatty acids together accounted for 25% of the total lipid (largely wax esters) of the copepods whereas 22:1 (n-11) fatty acid accounted for only 8% of the body lipid (largely triacylglycerols) of fish fed copepods. It is suggested that 22:1 (n-11) is selectively utilized as an energy source in fish. (Auth.)

B-31189

Sil'ianova, Z.S., **Oogenesis and stages of maturity of fishes of the family Nototheniidae,** *Journal of ichthyology,* 1981 21(4), p.81-89, Translated from Voprosy ikhtiologii. 14 refs.

DLC SH1.V713

Maturation of the ovaries in seven species and subspecies of the family Nototheniidae was studied during the annual cycle. The development of two generations of oocytes of the period of trophoplasmic growth was established. One generation was spawned, the other remained in the ovaries to constitute the spawn of the following year. On the basis of this, the designation of the postspawning stage of maturity is more precisely defined. Spawning occurs at different times and at any time of the year in the Southern Hemisphere. (Auth.)

B-31190

Blake, J.A., ***Scalibregmatidae* (Annelida: Polychaeta) from South America and Antarctica collected chiefly during the cruises of the R/V *Anton Bruun*, R/V *Hero* and USNS *Eltanin*,** *Biological Society of Washington. Proceedings,* Dec. 31, 1981 94(4), p.1131-1162, Refs. p.1159-1162.

DLC QH1.B4

A total of 14 species in 8 genera are reported from South America and Antarctica. The generic synonymies of *Pseudoscalibregma* Ashworth are clarified. *Scalibregmides* Hartmann-Schröder is resurrected from synonymy and redefined. Six species are new to science, several are redescribed. A revised scheme to the scalibregmatid genera is presented, along with a list of valid species. *Proscalibregma linea* Hartman, 1967 has been determined to belong to the Opheliidae, while *Scalispinigera oculata* Hartman, 1967, and *S. cirrata* Hartman and Fauchald, 1971 are related to the Hesionidae. (Auth.)

B-31191

International Synposium on Krill, 1st, Wilmington, NC, Oct. 1982, **Proceedings: Biology of the antarctic krill *Euphausia superba*,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), 337p.

The symposium was held at the University of North Carolina in Wilmington. 37 participants, including 14 from overseas, met to review and consolidate what is known of the many biological aspects of krill. For the 24 papers presented see B-31192 through B-31215.

B-31192

George, R.Y., **Biology of the antarctic krill: what are the fundamental hypotheses,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.9-12, 11 refs.

A review is given of major krill studies since the 1960s and of various hypotheses advanced regarding behavior, life span, physiology, impact of the krill environment, distributions, and others. The focus themes of the symposium are stated: krill swarming behavior, feeding, energy flow, adaptations, growth, and embryo and larval metabolism.

B-31193

Deacon, G.E.R., **Water movements and antarctic krill,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.13-15, 1 ref.

A short outline is given of the ideas James Marr, to whom this volume is dedicated, propounded in 1962 (2B-2902). Emphasis centered on krill reproductive aspects and geographic distribution *vis à vis* the Antarctic Convergence, the antarctic shelf, water temperature, and ocean currents.

B-31194

Macaulay, M.C., English, T.S., Mathisen, O.A., **Acoustic characterization of swarms of antarctic krill *(Euphausia superba)* from Elephant Island and Bransfield Strait,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.16-44, 14 refs.

Time series of acoustic observations with three frequencies were made on Antarctic krill. Local changes of biomass were ten-fold over 2-3 days. The total biomass in a very large swarm near Elephant Island was 2.1 million metric tons distributed over 450 sq km. The abundance in the swarm was 200-500 g/cu m over a vertical extent from 10-240 m. Smaller patches were 40-150 g/cu m and often associated with the 100-150 m bottom contour. Assessing the distribution and abundance of very large swarms presents problems beyond those of routine acoustic surveys. (Auth.)

B-31195

Brinton, E., Antezana, T., **Structures of swarming and dispersed populations of krill *(Euphausia superba)* in Scotia Sea and South Shetland waters during January-March 1981, determined by bongo nets,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.45-66, 25 refs.

From collections made through much of the Scotia Sea and near the South Shetland Is., length-frequency distributions of juvenile and adult krill are studied. An eastern population in the Scotia Sea was distinguishable by a 35 mm, nonreproductive mode, and a western population by a 35 mm and 55 mm reproductive bimodal distribution. One swarm was encountered in each subregion. Most catches indicated relatively dispersed krill. Elsewhere, in the Bransfield Strait and near Elephant Island, population length-frequency structures were more complex, indicating mixtures of age groups of different origins. A mid-March swarm located acoustically in Bransfield Strait was dominated by Year-2 krill of 30-45 mm, with a unique minor mode at 14-22 mm and a secondary mode centered upon 50-53 mm adults. Around Elephant Island, two kinds of size distributions, largely separate in space, characterized generally abundant krill: (1) a 50-55 mm mode wherein adult males predominated, and (2) a modeless 30-50 mm range wherein females predominated. (Auth. mod.)

B-31196

Hamner, W.M., **Aspects of schooling in *Euphausia superba*** , *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.67-74, 20 refs.

Divers observed schools of *Euphausia superba* off the South Shetland Islands and in Gerlache Strait. Euphausiids almost always occurred within the confines of dense schools swimming in one direction. Schools formed an infinite variety of shapes but usually were narrow in at least one dimension, so that individuals within a school were never far from its edge. Schools moved at about 20 cm/s, primarily horizontally, and vertical displacement was always accompanied by much larger horizontal excursions. Opaque, presumably necrotic, euphausiids occurred within schools, indicating that schooling may have epidemiologic disadvantages. Schools exhibited a variety of behavioral responses to potential and actual predators (sea birds and whales). A hypothesis of ontogenetic differences in schooling behavior proposes that juveniles migrate long distances horizontally in search of food over both shallow and deep waters, but that schools of adults spawn in or near deep water so that rapidly sinking eggs are not deposited on the sea bed. (Auth.)

B-31197

Schulenberger, E., Wormuth, J.H., Loeb, V.J., **Large swarm of *Euphausia superba:* overview of patch structure and composition,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.75-95, 6 refs.

Twenty-five MOCNESS (Multiple Open/Closing Net and Environment Sensing System) tows were taken in and around a large swarm of *Euphausia superba* near Elephant Island. Krill from all 25 tows (201 samples) and the copepods from 9 tows (63 samples) have been analyzed. Significant agreement in rank order of abundance is found for both krill and nonkrill fractions. Most copepod species show significant covariation; there is less significant covariation among euphausiid categories. Larvae of *E. superba* and *Thysanoessa* spp. co-occur and show strong positive covariation. There are large day-night differences in catches of both adult and, to a lesser degree, larval euphausiids. Vertical boundaries between larval and adult *E. superba* are often sharp, and larvae may occur either above or below significant adult concentrations. (Auth.)

B-31198

Quetin, L.B., Ross, R.M., **School composition of the antarctic krill *Euphausia superba* in the waters west of the Antarctic Peninsula in the austral summer of 1982,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.96-106, 18 refs.

It was found that schools of different size and maturity composition were geographically separated. Gravid females were found to the northwest of the South Shetland Islands arc and south of Elephant Island. Schools from inside Bransfield Strait and between Palmer Archipelago and the Antarctic Peninsula were primarily juveniles. Schools of mixed composition were found between these two areas, where a southwesterly current coming from a region of gravid females and a northeasterly current coming from a region of juveniles meet. The distribution pattern found during the summer of 1982 has been seen in part by earlier investigators, leading to the belief that the pattern is more than a transitory phenomenon. The location of areas of potential recruitment is particularly important for future management schemes for the developing krill fishery. (Auth.)

B-31199

Fevolden, S.E., George, R.Y., **Size frequency pattern of *Euphausia superba* in the Antarctic Peninsula waters in the austral summer of 1983,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.107-122, 23 refs.

Schools of krill were analyzed for size frequencies and maturity stages. Juveniles dominated in all schools, and mature animals never exceeded 6.8% of the animals at any sampling site. Gravid females were encountered in only four out of 15 schools and were never more frequent than 1.8% of the animals in any school. Among subadults and juveniles the largest animals were found on the inside of Palmer Archipelago. Smaller nonreproductive animals were on the outside and in Bransfield Strait. A second group of juveniles, in a size range of 12-15 mm, was more pronounced north of Crocker Passage than south of the Passage. Their potential origin from a more slowly growing and later spawning Southern Weddell Sea population is discussed. Lack of reproductive animals in the Bransfield/South Shetlands vicinity may reflect yearly variation in this region. A hypothesis is put forward on the basis of this study that Palmer Archipelago is a nursery ground for krill spawned elsewhere. The sites of origin of this krill could be ascertained on the basis of studies of enzyme polymorphism in these populations. (Auth.)

B-31200

Boyd, C.M., Heyraud, M., Boyd, C.N., **Feeding of antarctic krill *Euphausia superba*,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.123-141, 37 refs.

Measurements of rates of feeding indicate that *Euphausia superba* can feed on particles ranging from nanophytoplankton to macrozooplankton; a typical animal of 120 mg dry weight processes about 450 ml water per h and ingests at a maximum about 100% of its body carbon per day. A food concentration of about 100 microg carbon/l allows the animal to ingest its minimum food requirement of 2.3% body carbon per day. Measurements of Po-210 and Pb-210 indicate krill from Bransfield Strait in February 1982 were feeding herbivorously. Photographic analysis of the thoracic legs employed by *E. superba* for feeding indicates that the mechanical power required to extract phytoplankton from the water ranges up to about 30% of its total respiratory energy. (Auth.)

B-31201

Antezana, T., Ray, K., **Active feeding of *Euphausia superba* in a swarm north of Elephant Island,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.142-155, 29 refs.

Contrary to previous assumptions, field data strongly suggests that feeding and swarming are co-occurring events north of Elephant Island. Three lines of evidence suggest intense, active feeding behavior of swarming krill: (1) the distribution of elevated stomach pigments is consistent with an abrupt "southeast-northwest" chlorophyll a gradient; (2) pigment-laden stomachs predominate in the area for hours, days, and even weeks; and (3) egestion rates in the absence of food suggest that animals should empty their stomachs within a few hours. Based on feeding and egestion behavior, stomach capacities, pigment content of feces, krill densities, and ambient chlorophyll a, the feeding potential of krill within the swarming area north of Elephant Island is evaluated. Because exceptionally full krill stomachs can not be explained by feeding on phytoplankton alone, we suggest that coprophagy may be occurring within the swarm. We propose that swarming may have adaptive feeding advantages not unlike those occurring in organisms of various phyla which exploit ephemeral, patchy food sources. (Auth.)

B-31202

Holm-Hansen, O., Huntley, M., **Feeding requirements of krill in relation to food sources,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.156-173, 55 refs.

Krill biomass, determined on samples obtained by paired bongo nets has been used to calculate the minimal daily food requirements for all stages of krill from Calyptopis I to the adult stage. Our calculations have been concerned mainly with the minimal daily carbon requirements for "maintenance" metabolism. Data of other investigators have been used to compare the total carbon requirement for growth of krill on a seasonal basis. In areas of dense krill aggregations our calculations indicate that phytoplankton productivity can sustain "maintenance" metabolism by the krill population, but may not provide for full growth of the individuals. Other factors must be invoked here, such as dispersal of the swarm, horizontal movements of the krill along lines of increasing food concentrations, and advection of food resources into the swarm area. The Scotia Sea is very high in primary production as compared to most other sections of the Antarctic Ocean, and this might be responsible for the high krill biomass reported for this area. However, the greatest krill concentrations exist in the East Indian Ocean where data indicate that primary production is very low. This anomaly requires further investigation. (Auth. mod.)

B-31203

Johnson, M.A., Macaulay, M.C., Biggs, D.C., **Respiration and excretion within a mass aggregation of *Euphausia superba:* implications for krill distribution,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.174-184, 36 refs.

The oceanographic environment within a mass aggregation of krill encountered north of Elephant Island in March 1981 was sampled with a submersible pump/CTD combination. Estimates of acoustic biomass made concurrently at 50 kHz were used to infer krill population density. At depths between 50-100 m, differences in dissolved oxygen and ammonium ion between two pumped hydrocasts made within the krill school and two made at adjacent sites but outside the school averaged -0.15 ml oxygen/l and +0.75 microgram-atoms NH4 cations/l. Using previously reported data on the respiration and excretion rates of individual krill, it is demonstrated that these differences could have been generated in 16-18 h. From information on the mean velocity of near-surface currents in the vicinity of Elephant Island, it is speculated how population density of krill schools may be constrained in time and space. (Auth.)

B-31204

Morris, D.J., **Filtration rates of *Euphausia superba* Dana: under- or overestimates,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.185-197, 7 refs.

Filtration rates of adolescent *Euphausia superba* obtained by both constant volume and flow-through techniques are presented. Filtration rate data for a range of particle sizes are presented. An increase in the number of large particles in the water by enrichment with artificial microcapsules results in a shift of the filtration rate efficiency to a larger size range. This is expressed comparatively by the calculation of selection indices and discussed in terms of the filtration mechanism of krill. A marked difference between filtration rates is found when data from constant volume and flow-through techniques are compared. This is examined by comparison with other published data and alternative estimates of filtration rate are extrapolated from oxygen consumption values, energetics data, and filtering basket sweep frequency. The proposed high level of filtration rate for krill is discussed in relation to the filtration mechanism. (Auth.)

B-31205

Rakusa-Suszczewski, S., Godlewska, M., **Energy flow through krill aggregations in Drake Passage and Bransfield Strait,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.198-205, 16 refs.

Krill biomass and the size distribution of krill are of great importance for energy flow through krill aggregations. Spatial distribution of energy flow through swarms of *Euphausia superba* may be entirely different from krill biomass distribution as determined by the hydroacoustic technique. (Auth.)

B-31206

Fevolden, S.E., **Biotic and physical environmental impact on genetic variation in krill,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.206-223, 33 refs.

A number of different species of krill have been subjected to analysis of possible correlations between selected environmental variables (niche descriptors) and enzyme heterozygosity. Niche descriptors such as temperature variation, vertical migration, and trophic diversity (phyletic diversity of food eaten by the animal) exhibited pronounced correlations with allelic variation in several gene loci coding for selected enzymes. Correlations between niche descriptors and average heterozygosities over groups of enzymes (central metabolic, peripheral) instead of individual enzymes, were less pronounced. These results are discussed in terms of two hypotheses that both ascribe an adaptive role to enzyme variation. The correlation data lends support to both hypotheses without favoring one over the other. (Auth. mod.)

B-31207

Brinton, E., Townsend, A.W., **Regional relationships between development and growth in larvae of antarctic krill, *Euphausia superba,* from field samples,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.224-246, 38 refs.

Larvae of *Euphausia superba* were sampled during January-March 1981 in three Antarctic areas: the Scotia Sea (twice), waters near Elephant Island in the South Shetlands (twice), and Bransfield Strait. Larval forms from the three areas are compared as to population density and growth during the study time period. Details of the results are presented.

B-31208

Marschoff, E., Tomo, A., **Vertical distribution of calytopes larvae of *Euphausia superba* in the Scotia Sea,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.247-251, 15 refs.

In order to discriminate between depth distribution governed by developmental ascent and/or vertical migration, sixteen samples taken on board the RV *Holmberg* were analyzed. The conclusion is reached that there exists a 24-h based difference in abundance of Calyptopes I and II in the upper 200 m; results suggest but do not confirm that it is due to depth-time interaction. (Auth.)

B-31209

George, R.Y., **Ontogenetic adaptations in growth and respiration of *Euphausia superba* in relation to temperature and pressure,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.252-262, 29 refs.

The krill egg development rate is measured in relation to temperature. Metabolic scope is discussed in relation to ontogenetic stages and in comparison with other euphausiid species in the Antarctic Ocean (Auth. mod.) The duration from spawning to hatching is about 5-6 days at -0.5C. The embryological growth is somewhat faster at 2C. The development of krill eggs, cultured at 20 atm, showed progression through the various cleavage stages to the formation of the blastula. However, abrupt exposure of newly spawned krill eggs to 100 and 200 atm interfered with normal development and, therefore, high pressure (200 atm) inhibited embryogenesis. The active metabolic rate of krill was also investigated in this study with particular emphasis on ontogenetic differences.

B-31210

George, R.Y., Fields, J.R., **Ammonia excretion in the antarctic krill *Euphausia superba* in relation to starvation and ontogenetic stages,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.263-272, 22 refs.

The rate of ammonia excretion in different stages of fed and starved krill from Bransfield Strait was determined at 1.8C. Brief starvation induced a significant impact in depressing ammonia excretion in all stages of krill. Ammonia excretion rate in freshly captured krill is exceedingly high with peak levels reaching as much as 260 micrograms NH3/g dry wt/h. This study also evaluates the krill excretion rate in relation to other planktonic species from temperate, tropical, and polar seas. This finding of high rate of catabolic activity in krill is in agreement with recent discovery of the unusually high feeding rate of krill. (Auth.)

B-31211

Ikeda, T., **Sequences in metabolic rates and elemental composition (C, N, P) during the development of *Euphausia superba* Dana and estimated food requirements during its life span,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.273-284, 61 refs.

Some general trends over the life history of *Euphausia superba* in the rates of metabolic activities and in the elemental composition are presented. The O2 uptake rate of the eggs is low, rising to a maximum in the calyptopis stage, then decreasing gradually as development proceeds towards maturity. Phosphate excretion rates tend to decrease from the calyptopes to the adults, while ammonia excretion rates are rather constant throughout these developmental stages. The high C content of the eggs has dropped markedly by the calyptopis but then rises gradually with development towards the adult. The N content is rather stable throughout the development from eggs to adults. The eggs contain a low content of P, but P reaches its maximum value at the calyptopis stage. The P content declines in the development from calyptopes to adults. The total food requirement of *E. superba* during its life in the southern ocean is estimated by combining the metabolic data with two growth computations: the M-scheme and the MS-scheme. (Auth. mod.)

B-31212

Clarke, A., **Lipid content and composition of antarctic krill, *Euphausia superba* Dana,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.285-294, 37 refs.

Available data on the lipid content and composition of the Antarctic krill *Euphausia superba* Dana are summarized. Female total lipid content increases during the summer as the ovary matures, and there is also some evidence of an increase in the lipid content of males and immatures as winter approaches. The storage lipid is mainly triacylglycerol and there is less than 1% wax ester. Fatty acids are moderately unsaturated, though less so in the ovarian lipid, and the triacylglycerol contains up to 4% phytanic acid. These data suggest that krill feed on phytoplankton during the summer bloom, but that, unlike *E. crystallorophias, E. superba* does not rely on a lipid store to survive the winter. (Auth.)

B-31213

Ettershank, G., **New approach to the assessment of longevity in the antarctic krill *Euphausia superba*,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.295-305, 33 refs.

Previous research to ascertain the life cycle and longevity of the antarctic krill by means of length-frequency distributions is reviewed; this traditional method has led to widely differing answers. In the light of new knowledge that the overwintering strategy of krill involves negative growth, such an approach is unrealistic. The assay of lipofuscin, a fluorescent pigment that accumulates in all cells of aerobically respriring organisms as a function of physiological time, may offer a solution to this problem. The lipofuscin content and morphometric parameters of a sample of gravid females were measured. On the basis of the lipofuscin assay, three year groups were defined. Discriminant functions were calculated showing that the year classes could be distinguished on morphological characters alone. (Auth.)

B-31214

Amos, A.F., **Distribution of krill *(Euphausia superba)* and the hydrography of the southern ocean: large-scale processes,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.306-329, 99 refs.

This paper is a review of the large-scale features of distribution of krill and the hydrography of the southern ocean, as determined from the major oceanographic research expeditions of the 20th century. It is intended for the biologist interested in the physical oceanographic literature of the southern ocean and includes some of the basic krill literature for the oceanographer engaged in multidisciplinary research programs. The broad features of krill distribution from an oceanographer's viewpoint are described, followed by a general account of the hydrographic methods and their possible application to krill research. A sector-by-sector excursion around Antarctic circumpolar waters describes the hydrography of each sector. The literature is primarily from those studies where basic physical oceanography was the major impetus for the study. (Auth.)

B-31215

El-Sayed, S.Z., George, R.Y., **Workshop on krill distribution in relation to physical and biological oceanographic parameters in the southern ocean,** *Journal of crustacean biology,* Nov. 1984 4(Special No.1), p.330-337.

The workshop followed the symposium featured in this issue and used the organization of a five-member panel, a moderator, and all other participants in the symposium. Nine questions were addressed: What is known of the size and age structure of krill swarms and what is the effect of the environment on the swarms; what is known of the krill breeding behavior/sites and what would be the effects of large-scale harvesting; explain the presence of krill outside the Antarctic Convergence; what is the seasonal status of krill stocks, food stocks and geographic distribution; what is *E. superba's* life span, age, and rematuration compared to northern euphausiids; what are the ramifications of krill egg sinking behavior; what is known of krill larval/adult growth rates; do krill have special low temperature adaptive mechanisms; is a 3 or 4 dimensional model of krill distribution and life cycle possible from present knowledge. The substance of responses and discussions of participants are given from an edited transcript.

B-31216

Blanco, O.M., **Data on antarctic and subantarctic hydrozoa** [Contribución al conocimiento de hidrozoos antárticos y subantárticos], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1984 No.294, 53p., In Spanish, with 109 illustrations and English, French and German summaries. Refs. p.51-53.

Based on samplings from five transects carried out in Paradise Harbor and on sample collections from the research ship *NSF Hero,* the hydrozoa in antarctic and subantarctic waters have been studied and are described and illustrated, totaling 30 species distributed in 8 families and 15 genera. Three of them are considered new species and are reported separately. (Auth.)

B-31223

Pushkin, A.F., **New species of the genus *Pycnogonum* (Pantopoda) from the Antarctic** [Novyĭ vid roda *Pycnogonum* (Pantopoda) iz Antarktiki], *Zoologicheskiĭ zhurnal,* July 1984 63(7), p.1102-1104, In Russian with English summary. 3 refs.

Pycnogonum gordonae sp. n. differs from a closely related *P. gaini* Bouvier by a proboscis enlarged distally and crowned with dorsal hump and a distinct rounded low tubercle on the cephalic segment immediately behind the ocular tubercle. These differences may be observed both in larvae and adults, and are shown in drawings. Specimens of both species were taken in the Cormorant Sea.

B-31230

Armstrong, W.G., Dilly, P.N., Urbanek, A., **Collagen in the pterobranch coenecium and the problem of graptolite affinities,** *Lethaia,* 1984 17(2), p.145-152, 46 refs.

Amino-acid analysis of the extracellular skeleton (coenecium) of two pterobranchs (Hemichordata) *Rhabdopleura normani* and *Ceph-*

alodiscus (C.) hodgsoni shows that both contain considerable quantities of collagenous material with relatively high hydroxyproline and low hydroxylysine levels. The appearance of the fibrous material in the skeleton of pterobranchs, although collagenous, differs from standard EM characteristics of collagen. The identification of the collagenous nature of the pterobranch skeleton with the presumed presence of collagen-like material in the periderm of fossil graptolites, taken in conjunction with other data, supports the hypothesis that both groups may be closely related phylogenetically. The *C. hodgsoni* specimens were collected in Admiralty Bay, King George Island. (Auth. mod.)

B-31233

Gasparini, Z., Valle, R.A. del, Goñi, R., **Elasmosaurus (Reptilia, Plesiosauria) of the Upper Cretaceous in the Antarctic,** *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1984 No.305, 24 + 24p., In Spanish and English, with French and German summaries. 22 refs.

The first Elasmosaurus *(Reptilia, Plesiosauria)* from the Antarctic continent is described. It was found on Seymour Island in rocks of the López de Bertodano Formation (marambio Group) which is assigned to the Upper Cretaceous. The specimen studied is incomplete and though it shows differences from all the known Cretaceous plesiosauria, these are not sufficient in order to refer the specimen with certainty to a new genus and species. The bearing rocks were deposited in a littoral intertidal environment, into a marginal lagoon/barrier complex, typical of a lineal coast, and under a warm climate. (Auth.)

B-31239

Knox, G.A., **Key role of krill in the ecosystem of the southern ocean with special reference to the Convention on the Conservation of Antarctic Marine Living Resources,** *Ocean management,* July 1984 9(1,2), p.113-156, Refs. p.152-156.

Information on exploitation of antarctic living resources with special reference to the past two decades is analyzed and the impact of this exploitation on the stocks of krill, fish, and whales is evaluated. Ecosystem changes following the decline in whale stocks are detailed and potential ecosystem changes that may result from intensive krill harvesting are considered. The history of the development of the Convention on the Conservation of Antarctic Marine Living Resources is outlined and the salient features of the Convention are discussed. This Convention is unique among fisheries conventions, in that it adopts an ecosystem approach to the management of living resources. The main features of this Convention are outlined and the management principles that stem from it are detailed. Problems involved in the adoption of an ecosystem-management approach are considered. Finally, the information needs for management are examined with special reference to the international BIOMASS research programme. The prospects for achieving the objectives of the Convention are considered. (Auth.)

B-31241

Morley, J.J., Stepien, J.C., **Siliceous microfauna in waters beneath antarctic sea ice,** *Marine ecology progress series,* Oct. 1984 19(3), p.207-210, 9 refs.

Plankton tows sampling various water depths beneath antarctic sea ice recovered a high proportion of the cold water assemblage of radiolaria present in Recent surface sediments underlying these waters. Of the 3 depth intervals sampled, the highest abundances of polycystine radiolaria were collected in vertical tows from the upper 100 m. Phaeodarian radiolarians occupy a slightly deeper habitat in ice-covered waters with highest concentrations occurring in tows sampling depths between 100 and 200 m. The water structure at the ship station where the highest numbers of polycystine radiolarians were collected was unique in that it consisted of an entrained warm cell of Weddell Deep Water surrounded by cold Weddell Deep Water. (Auth.)

B-31243

Müller-Schwartze, D., **Behavior of penguins adapted to ice and tropics,** Albany, State University of New York Press, 1984, 193p., Ref. p.179-186.

DLC QL696.S473M82 1984

A general account is given of the behavior and life history of penguins. In the first section, the history, zoogeography, social behavior, diving, and adaptations of the family are briefly covered. Part two focuses on the species of penguins and their breeding, behavior, diets, predators and migrations. The Adélie penguin *(Pygoscelis adeliae)* is discussed in the most detail. Numerous photographs of penguins and their environment illustrate the features discussed. (Auth.)

B-31250

Whales of the Antarctic [El Antártico y sus ballenas], *Antártida,* Feb. 1984 No.13, p.43-51, In Spanish.

Different types of whales are described, including their appearance, behavior, habitat and exploitation. Krill, the blue whale's basic food source, is also reviewed.

B-31255

Kanda, H., **Studies on antarctic mosses,** *Polar news,* July 1984 No.39, p.29-32, In Japanese.

During 1982-1984, the author, a bryologist, joined the 24th Japanese Antarctic Research Expedition as a member of the wintering group. The aim of the study was to investigate the life history of mosses living in the Showa Station area. In the 1982/1983 austral summer, botanical work in the ice-free area was carried out to gather data for vegetation maps at Rundvagshetta, Einstodingen and Strandnebba in Lützow-Holm Bay. Colonies of *Bryum pseudotriquetrum* were found which bore matured sporophytes at each locality. The occurrence of the fruiting plants is considered to be a first record in the continental Antarctic. In the 1983 winter season, the ecological study of mosses focussed on reproduction processes (asexual reproduction or dispersal by spores). The growth of mosses depends upon microclimatic conditions relating to the supply of water, temperature, radiation and nutrition. The water supply from accumulated snow drifts is essential. However, thawed water seems to be supplied in a period of less than two months a year. In addition to the effect of harsh climatic conditions, biological disturbances of the natural vegetation are conspicuous in the continental Antarctic. (Auth.)

B-31256

Watanabe, K., **Wintering at Syowa Station,** *Polar news,* July 1984 No.39, p.38-41, In Japanese.

The author participated in the 24th JARE wintering party as a marine biologist. From March to January 1984 the ecology of ice algae near Showa Station was investigated as part of the BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) project. Six dives under the ice were made during overwintering to study ice algae and observe the filamentous micro-algae colony attached to the undersurface of the spring sea ice. (Auth.)

B-31259

Blokhin, S.A., **On the functional activity of the sexual system of sperm whale males,** *International Whaling Commission. Report,* 1981 No.31, p.719-721, 13 refs.

DLC SH381.I484

Sperm counts of the seminal fluid of 111 sperm whales taken in three areas (central Indian Ocean, Antarctic and North Pacific) are presented along with counts from 7 minke and 44 Bryde's whales. The data, although showing that sperm whale males in both hemispheres reach sexual maturity at lengths of 9.5-10.0 m, strongly suggest that it is the large physcially mature males (Southem Hemisphere: 14.0-16.0 m; North Pacific: 16.0-18.0 m) which are pirmarily involved in reproduction. It is concluded that the prohibition on the taking of sperm whales over 13.7 m during the breeding season is justified. (Auth.)

B-31260

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **BIOMASS Executive report of 1984 meeting, Cambridge, UK, 20-22 June, 1984,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Aug. 1984 No.38, 11p + 6p.

Information made available to the Executive from Chief Scientists reports on SIBEX Phase 1 indicates that Argentina, Brazil, Chile, Federal Republic of Germany, Japan, United Kingdom, Australia, France, and South Africa will send ships to participate in SIBEX Phase 2. It is also reported that the Peoples Republic of China will send a research vessel to the Antarctic in the 1984-1985 season. Discussions cover a request from United Nations for information to facilitate a study of the Antarctic; a request from the Chairman of the Acoustic Working Party for the arrangement of the Post-FIBEX Acoustic Workshop to be held in September 1984; a multi-national, shore-based investigation of krill physiology; future BIOMASS programs and, particularly, the need for a data center associated with the Group of Specialists, with location, funding, security, equipment, etc. of such a center outlined in detail. Protocols for Post-FIBEX Acoustic Workshop, the 1984 BIOMASS budget, and BIOMASS-related meetings 1984 and 1985 are presented in annexes 1-3.

B-31261

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Report of Acoustic Working Party meeting to prepare for Post-FIBEX Acoustic Workshop, 1984,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* Aug. 1984 No.37, 60p.

The first part of this report reviews discussions concerning the Workshop on the FIBEX acoustic data to be held in Frankfurt in September 1984; the manpower for the Workshop preparation; the progress with FIBEX acoustic data processing since the 1981 Workshop; and the recent publications on krill acoustic work. Part 2 consists mainly of a review of the Workshop protocols and an analysis of FIBEX acoustic data processing on krill. Five appendixes and two tables with details concerning the above subjects are included.

B-31262

Lishman, G.S., **Comparative breeding biology of Adélie and Chinstrap penguins *Pygoscelis adeliae* and *P. antarctica* at Signy Island, South Orkney Islands,** *Ibis,* Jan. 1985 127(1), p.84-99, Refs. p.98-99.

Adélie and Chinstrap Penguins breed in abundance at Signy Island. During the 1980-81 and 1981-82 breeding seasons daily checks were made to record laying date and interval between laying, egg weight and volume, incubation period and shifts by each parent, hatching date and interval between hatching, the date on which the young first crèched and their age at the time, and fledging date and age. This was done for the eggs and chicks from 60 marked nests of each species. Adélies started breeding about one month before Chinstraps and showed other adaptations which may relate to early breeding. These adaptations included longer incubation shifts and a heavier and larger first egg. Chinstraps had shorter incubation shifts and both eggs had similar weights and volumes. Chinstraps were unable to cope with persistent heavy ice conditions in 1980-81 and were no more successful than Adélies in 1981-82. All previous breeding data for both species are reviewed and it is suggested that early breeding by Adélies may be a consequence of competition for food with Chinstraps but, by retaining adaptations to harsh environmental conditions, Adélies are well able to breed successfully. Conversely, Chinstrap penguins appear mainly adapted to milder environmental conditions and it is unlikely that they could compete successfully with Adélie Penguins at breeding sites on the Antarctic Continent. (Auth.)

B-31268

International Whaling Commission, **Thirty-fourth report of the International Whaling Commission,** Cambridge, England, 1984, 752p., Refs. passim. For selected papers see B-31269 through B-31284.

DLC SH381.I484

The report contains materials from the following meetings: the 35th Annual Commission and Scientific Committee meetings; the Minke Whale Ageing Workshop held by the Scientific Committee in April 1983. In addition, sixty-three scientific papers are included, sixteen of which are reports of studies carried out in the Southern Hemisphere.

B-31269

Zahl, S., **Adjustments to the CPUE for antarctic minke whaling,** *International Whaling Commission. Report,* 1984 34, p.275-279, 9 refs.

DLC SH381.I484

A review and criticism of previously used models for making adjustments to the CPUE to account for differences in weather, season, etc., is given. The standard multiple linear regression model is again proposed based on an examination of the data. A new feature is the adjustment of both the catch and the CSW. The adjusted data is used to compute annual CPUEs for years 1973-1982 using the bias reducing formula of Zahl (1983). The resulting CPUE series shows no evidence of a decline and suggests the possibility of an increasing trend. (Auth.)

B-31270

Hammond, P.S., **Investigation into the effects of different techniques of smearing the IWC/IDCR minke whale sighting data and of the use of different models to estimate density of schools,** *International Whaling Commission. Report,* 1984 34, p.301-307, 11 refs.

DLC SH381.I484

Some of the techniques used to estimate the daily density of minke whale schools from the IWC/IDCR data are investigated. Several different smearing methods are examined, the variability produced by the use of random numbers to generate smeared distributions is quantified and two models of sighting probability other than the negative exponential are fitted to some example data. Inappropriate methods of smearing are shown to bias density estimates by an amount depending on the method and amount of smearing. The variation introduced as a result of smearing was found to depend on the number of simulations, the type of smearing, and the amount of smearing. Because the perpendicular distance data examined were "spiked" close to the transect line with an extended "tail" even after smearing in most cases, the negative exponential model underestimated f(0). (Auth.)

B-31271

Basson, M., Butterworth, D.S., **Exploratory investigation of the use of a hazard-rate model to assess the target motion correction factor in sighting estimates of minke whale abundance,** *International Whaling Commission. Report,* 1984 34, p.309-314, 11 refs.

DLC SH381.I484

A simulation model using the hazard-rate formulation has been developed to model minke whale sightings in shipboard surveys. The angular part of the hazard-rate function was matched to experimental results on observer behavior, and the radial part parameterized. The parameters were determined by best-fitting to observed radial and angular distributions of sightings. Computations did not indicate a target motion correction factor significantly different from 1; they did though suggest that the procedure used for determining g(0) from a varying vessel velocity experiment may produce a result with substantial negative bias. These results may however be a consequence of the specific form chosen for f(r), which did not yield a particularly good fit to the sightings distributions. Further forms for f(r) need to be investigated before definite conclusions can be drawn. (Auth.)

B-31272

De la Mare, W.K., Cooke, J.G., **Review of the stratification of sighting data used in the estimation of populations of Southern Hemisphere minke whales *(Balaenoptera acutorostrata)*,** *International Whaling Commission. Report,* 1984 34, p.315-322, 9 refs.

DLC SH381.I484

A review is undertaken of some principles to be observed in the stratification of sightings data. The contouring method currently used to estimate the abundance of Southern Hemisphere minke whales *(Balaenoptera acutorostrata)* is examined and found to have a number of shortcomings. Some sensitivity analyses show that the current contouring procedure is sensitive to departures from underlying assumptions. Evidence for bias is found in the existing contour diagrams. A brief outline is given of an alternative approach to conducting sightings surveys. (Auth.)

B-31273

Best, P.B., **Accuracy of shipboard estimates of the length of antarctic minke whales,** *International Whaling Commission. Report,* 1984 34, p.323-325, 9 refs.

DLC SH381.I484

The accuracy of shipboard estimates of body length for antarctic minke whales is investigated from the recapture of 28 marked whales whose length was estimated at marking and measured at recapture. After allowing for growth in the interval, the accuracy of the original length estimates is shown to be poor, with no significant correlation between estimated and "true" lengths over the range (7.2-9.2 m) tested. With the possible exception of one vessel, however, estimates of length appeared to be unbiased. (Auth.)

B-31274

Kato, H., Shimadzu, Y., Kirishima, K., **Biological simulation to examine historical changes in age at sexual maturity of the antarctic minke whale,** *International Whaling Commission. Report,* 1984 34, p.327-333, 14 refs.

DLC SH381.I484

A simulation study to examine historical changes in age at sexual maturity for female antarctic minke whales is presented, based on an interpretation of the relationship between mean number of corpora and age. By comparing predicted values of mean number of corpora against age from the simulation model and observed values, the validity of some assumptions is tested. Simulations are presented for various alternative assumptions of certain biological parameters: age at sexual maturity (tm) and ovulation rate (q) mainly estimated by the investigation of the transition phase in earplugs. An assumption of changing tm and age-dependent q reveals the smallest sums of squares (49.53) between predicted and observed values and most closely fits the observed trend. This study supports the assumption of a declining trend in tm from the 1940s (age 14) to the end of the 1960s (age 6.5), and the validity of transition phase analyses. (Auth.)

B-31275

Kasamatsu, F., Miyashita, T., **Abundance of minke whales in Area 2 between 55 S and 60 S,** *International Whaling Commission. Report,* 1984 34, p.339-344, 11 refs.

DLC SH381.I484

A Japanese research vessel, *Kyomaru No. 27,* carried out sightings and marking between 55 S-60 S in area II from 31 December 1982 to 12 January 1983. Three minke whales were marked and 46 minke, 5 fin, 3 sei, 7 humpback, 38 killer, 23 ziphiid, 40 pilot whales and 15 dolphins were sighted. Line transect theory abundance estimates of minke whales in the research area were obtained from the sightings data using both the stratification and contouring methods. Two strata were used in the former method and a total of 6,790 schools was estimated. 4,895 schools were estimated using the contouring method. School sizes ranged from 1-25 (average 3.29). The mean school size could not be obtained using the regression technique because of the negative slope, and thus the mean school sizes within the effective search half-width were used. The range of estimated body lengths was 18-22 ft, and the proportion takeable was 40% for the northern area, 63.4% for the southern area and 60.9% for the whole area. The stratification estimate was 14,730 (exploitable population 7,830) and the contouring estimate 11,540 (exploitable 7,030). (Auth.)

B-31276

Wada, S., **Movements of marked minke whales in the Antarctic,** *International Whaling Commission. Report,* 1984 34, p.349-355, With 2 appendixes. 8 refs.

DLC SH381.I484

The movements of antarctic minke whales are discussed in the light of 64 recaptured whales. They confirm that there is a strong trend to return to previous feeding grounds. The importance of examining operational factors in such studies is emphasized. Marks returned from minke whales in the Antarctic south of 40 S, and the summary of marking, recaptures and whaling operations in the Antarctic, are tabulated in the two appendixes included.

B-31277

Shimadzu, Y., Kasamatsu, F., **Operating pattern of antarctic minke whaling by the Japanese expedition in the 1982-1983 season,** *International Whaling Commission. Report,* 1984 34, p.357-359, 5 refs.

DLC SH381.I484

The Japanese expedition took minke whales in antarctic Areas IV-VI for 110 days from 19 November, 1982. A total of 3,224 whales were caught which fulfilled the allocated quota. Operations were concentrated in the eastern half of Area IV and western half of Area V due to successive bad weather in the rest of the area. The latitudinal position of the ice edge in the operation area with respect to the average pattern is discussed. (Auth.)

B-31278

Shimadzu, Y., Katabami, Y., **Note on the information on the pack ice edge obtained by Japanese catcher boats in the Antarctic,** *International Whaling Commission. Report,* 1984 34, p.361-363, 12 refs.

DLC SH381.I484

Observing a fair coincidence between formation of pack ice edge and noon position of factory ship, the latter is considered to represent location of pack ice edge. Information from operating catcher boats on their operating pattern and the observed pack ice edge also supported this relation, which is categorized and encoded for use as effort modifier. (Auth.)

B-31279

Butterworth, D.S., Best, P.B., Hembree, D., **Analysis of experiments carried out during the 1981-1982 IWC/IDCR antarctic minke whale assessment cruise in Area 2,** *International Whaling Commission. Report,* 1984 34, p.365-392, 7 refs.

DLC SH381.I484

During the 1981/82 assessment cruise, a number of experiments were carried out to investigate effects that could lead to biases in sighting estimates of minke whale abundance. Each of the three participating vessels carried out several experiments to check the accuracy of distance and angle estimates using a buoy with a radar reflector as a target, "true" distances and angles of the buoy from the ship being obtained from the radar screen. In addition two of the vessels checked distance and angle estimates for some closures during normal searching operations using a satellite navigator system. The only substantial bias identified was a tendency for distances (including shortfalls) to be underestimated on the *Shonan Maru No. 2* and all such values have subsequently been adjusted by multiplying them by 1.38. A few other cases of positive bias were identified, but their magnitude was too small to warrant correction. From the degree of error seen during the experiments, suitable rounding (or "smearing") factors were developed as follows: estimated distance 20%, shortfall 40%, calculated distance 20% (or speed 1 knot, closure time 20 seconds), and sighting angle 7 1/2%. A series of north-south transects from the pack ice was carried out to investigate the gradient in density of minke whale schools away from the ice edge. Inspection of the data, calculation of "near:far" ratios and the use of an exponential decline model all failed to indicate any significant trend (either increasing or decreasing) in the density of minke whale schools out to a distance of some 30 n. miles from the pack-ice edge. (Auth. mod.)

B-31280

Hammond, P.S., **Abundance of killer whales in antarctic Areas 2, 3, 4 and 5,** *International Whaling Commission. Report,* 1984 34, p.543-548, 18 refs.

DLC SH381.I484

The density and number of killer whales in those parts of antarctic Areas II, III, IV and V surveyed by the IWC/IDCR minke whale assessment cruises are estimated. There is no indication from the data that more searching effort was expended in areas of relatively high density; therefore an unstratified estimate was considered to be unbiased in this respect. The overall density and total number of killer whales in the areas surveyed were estimated to be 89 whales per 1,000 sq. nautical miles and 180,000 whales, respectively, with a coefficient of variation of 59%. (Auth.)

B-31281

De la Mare, W.K., Cooke, J.G., **Some further effects of error in age determination of the estimation of demographic parameters of whales,** *International Whaling Commission. Report,* 1984 34, p.711-715, 6 refs.

DLC SH381.I484

The effects of random and non-random errors in age determination on the estimation of demographic parameters of whales are explored by means of simulation trials using artificially generated data. Two error models are considered, one in which the age readings are unbiased but subject to random variation about the true age and a second model which has both random error and bias. The effects of these types of errors on the estimation of mortality rates, R2 recruitment rates, age at sexual maturity and growth curves are discussed. The estimated parameters are used in a population model to determine the sensitivity of estimated replacement yields to errors in age determination. (Auth.)

B-31282

Kato, H., **Sampling procedure for the earplugs provided to the Minke Whale Ageing Workshop,** *International Whaling Commission. Report,* 1984 34, p.717-718, 1 ref.

DLC SH381.I484

A total of 360 minke whale earplugs were taken from the earplugs collected by Japanese antarctic expeditions, to be used for comparative ageing experiments by several biologists for the IWC minke whale ageing workshop. The sample was selected from earplugs collected from Areas III or IV. Stratified sampling by two readability classes and nine corpora count classes (18 strata) was adopted: 20 samples were allocated to each stratum. (Auth.)

B-31283

Kato, H., **Readability of antarctic minke whale earplugs,** *International Whaling Commission. Report,* 1984 34, p.719-722, 2 refs.

DLC SH381.I484

The readability of minke whale earplugs in relation to season of collection and length of animal is examined for samples obtained by Japanese whaling expeditions between 1971-72 and 1980-81 (except 1976-77). Earplugs suitable for reading are categorized and the following factors examined: sampling rate (no. sampled/no. caught); readability in the catch (no. readable/no. caught); actual readability (no. readable/no. sampled); and true unreadability (no. truly unreadable/no. sampled). True readability is found, along with sampling rate, to increase with season. This is thought to be due to improved collecting and handling procedures. Although true readability remains constant, sampling rate is found to increase with body length up to about 26-27 feet. The apparent low readability in smaller animals is thus due to the low sampling rate. Sampling rate is believed to be the most important factor in readability, of those examined. (Auth.)

B-31284

Mizroch, S.A., Breiwick, M., **Variability in age at length and length at age in antarctic fin, sei and minke whales,** *International Whaling Commission. Report,* 1984 34, p.723-732, 5 refs.

DLC SH381.I484

The proportion of fin, sei and minke whales which have been aged is presented by length class. Since both age and length are subject to errors in measurement, the data were analyzed two ways—mean age at length and mean length at age. Tabulated mean ages at length, standard errors and coefficients of variation of mean ages at length are presented by species and sex. Sample sizes within each length or age class vary considerably. Where samples are small, the variability is large. Analyses are presented for samples of 50 or more when comparing mean age at length and 40 or more when comparing mean length at age, since the variation with smaller samples is so great it would tend to compress and obscure the patterns of variability of the larger samples.

B-31287

Ajmal Khan, S., **Antarctic krill—the potential untapped,** *Seafood export journal,* Oct. 1983 15(10), p.26-28, 4 refs.

Biological, fishing and processing aspects of krill are briefly reviewed.

B-31301

Sahrhage, D., **First restrictions for the conservation of antarctic fish stocks** [Erste Schonmassnahmen zur Erhaltung antarktischer Fischbestände], *Hamburg. Bundesforschungsanstalt für Fischerei. Informationen für die Fischwirtschaft,* 1984 31(4), p.176-179, In German.

A brief report is given of the 3rd meeting of the CCAMLR in Hobart, Tasmania in Sep. 1984. Nations participating in the Conference are listed and statistical regions and areas of interest around Antarctica are shown. Special emphasis for study and conservation is given to the status of fish stocks particularly to *Notothenia rossi, N. gibberifrons, Champsocephalus,* and *Dissostichus eleginoides* around the near-shore and sub-antarctic islands. Restrictions as to mesh size of fishing nets, catch size, and other restrictions are given. Some of these are noted as being unacceptable to the USSR, the GDR, and Poland.

B-31302

Sahrhage, D., **Second International BIOMASS Experiment (SIBEX) and fish stock investigations in the Antarctic** [Zweites internationales BIOMASS-Experiment (SIBEX) und Fischbestandsuntersuchungen in der Antarktis], *Hamburg. Bundesforschungsanstalt für Fischerei. Informationen für die Fischwirtschaft,* 1984 31(4), p.179-181, In German. 3 refs.

The aims of SIBEX are explained, with emphasis on the need to preserve the ecosystems if and when commercial exploitation begins. The German ships involved are named and their cruise areas outlined. The role of krill in the antarctic ecosystems is discussed.

B-31303

Odening, K., **Antarctic animal world: an introduction to the biology of Antarctica** [Antarktische Tierwelt: Einführung in die Biologie der Antarktis], Leipzig, 1984, 160p., In German.

In this popular account a background chapter on the antarctic physical environment and its development is given, including the near-shore, and the cold and maritime subantarctic islands. This is followed by chapters on the lower forms of plant and animal life, the fish, birds, seals, whales, the floral communities, and elements of the various antarctic ecosystems. Color photographs are included and an index lists the numerous plant and animal species mentioned in the text.

B-31312

Kafanov, A.I., ed, **Fauna and distribution of crustaceans in notalian and antarctic waters** [Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod], Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, 119p., In Russian. Refs. passim. For selected papers see B-31313 through B-31317.

A collection of papers on benthic, pelagic crustaceans from temperate and antarctic waters is presented, with new data on the genus and species and their occurrence, ecology, and biogeography.

B-31313

Shornikov, E.I., **Antarctic and subantarctic Bythocytheridae ostracodes (with notes on the ontogeny of the Sclerochilini tribe)** [Ostrakody Bythocytheridae Antarktiki i Subantarktiki (s zămechaniiami ob ontogeneze triby Sclerochilini)], Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod (Fauna and distribution of crustaceans in notalian and antarctic waters). Edited by A.I. Kafanov, Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, p.4-39, In Russian. 16 refs.

Investigations off the antarctic coast and around South Shetland, Kerguelen, and Crozet Islands resulted in the finding of 10 species of ostracodes of 5 different genera, of which 5 species and 2 genera are reported to be new to science. Morphology, occurrence and ecology of the taxa are described. Study of Sclerochilini tribe ontogeny shows that it is characterized by numerous heterochronisms.

B-31314

Tsareva, L.A., **Addition to the fauna of the clawed isopod of the genus Asellus (Crustacea, Tanaidacea) from antarctic and subantarctic shelves** [Dopolnenie k faune kleshnenosnykh oslikov (Crustacea, Tanaidacea) shel'fovykh zon Antarktiki i Subantarktiki], Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod (Fauna and distribution of crustaceans in notalian and antarctic waters). Edited by A.I. Kafanov, Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, p.40-61, In Russian. Refs. p.59-61.

Information on the ecology and geographic distribution of 22 species of Tanaidacea, collected during 1965-1971 Soviet antarctic expeditions, is provided. New species described include: *Langitanais angustifrons, Cryptocopoides rotundata, Typhlotanais rostralis, T. gruzovi, T. pushkini* and *T. dubius Tzareva.* Also described are the *Paratanais oculatus* males.

B-31315

Vasina, G.S., Kusakin, O.G., **Four new species of isopod crustaceans of the genus *Acanthaspidia* (Crustacea: Isopoda, Janiridae) from the Antarctic** [Chetyre novykh vida ravnonogikh rakoobraznykh roda *Acanthaspidia* (Crustacea: Isopoda, Janiridae) iz Antarktiki], Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod (Fauna and distribution of crustaceans in notalian and antarctic waters). Edited by A.I. Kafanov, Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, p.62-72, In Russian.

Acanthaspidia bifurcatoides n.sp., *A. longiramosa* n.sp., *A. curtispinosa* n.sp., and *A. iolanthoidea* n.sp. are illustrated, described, and compared with related species.

B-31316

Kusakin, O.G., **Addition to the fauna of isopod crustaceans from the antarctic shelves (from Soviet Antarctic Expedition data 1965-1968)** [Dopolnenie k faune ravnonogikh rakoobraznykh shel'fovykh zon Antarktiki (po materialam Sovetskoĭ antarkticheskoĭ ekspeditsii 1965-1968 gg.)], Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod (Fauna and distribution of crustaceans in notalian and antarctic waters). Edited by A.I. Kafanov, Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, p.73-105, In Russian. Refs. p.103-106.

Of the 57 species collected by the Soviet antarctic expeditions 1965-1968, the following new species are described and illustrated: *Janthurella setifera, Serolis rugosa, Austrofilius pallidus, Austrosignum spinosum, Bactromesus antarcticus, Desmosoma antarcticum* and *Eurycope wolffi* Kussakin. Data on the ecology and geographic distribution of all the species are given.

B-31317

Dolzhenkov, V.N., **Zoogeographic partition of the southern Pacific surface waters by macroplankton** [Zoogeograficheskoe delenie poverkhnostnykh vod iuzhnoĭ chasti Tikhogo okeana po makroplanktonu], Fauna i raspredelenie rakoobraznykh notal'nykh i antarkticheskikh vod (Fauna and distribution of crustaceans in notalian and antarctic waters). Edited by A.I. Kafanov, Vladivostok, Dal'nevostochnyĭ nauchnyĭ tsentr AN SSSR, 1982, p.110-116, In Russian. 13 refs.

Based on a study of areal boundaries of 23 macroplankton species listed, southern and northern zoogeographic boundaries in the Pacific sector of the antarctic ocean are discussed and charted.

B-31320

Montague, T.L., **Food of Antarctic Petrels *(Thalassoica antarctica)*,** *Emu,* Dec. 1984 84(4), p.244-245, 9 refs.

The importance of krill in the diet of Antarctic Petrels *Thalassoica antarctica,* about 3-5 million of which nest in the Prydz Bay area, is pointed out. The frequencies of occurrence of pray species found in the stomachs in this and other studies are tabulated, showing that the only crustacean found in the stomachs in this study was *Euphausia superba* which occurred in all stomachs and in all but one contributed 100% to the volume of the contents.

B-31321

Skira, J., **Breeding distribution of the Brown Skua on Macquarie Island,** *Emu,* Dec. 1984 84(4), p.248-249.

It is reported that Skuas nesting in coastal areas of Macquarie Island increased by 17% between 1974 and 1983 censuses, but plateau-nesting Skuas decreased by 54%. The reduced breeding on the plateau is attributed to the scarcity of rabbits decimated by myxomatosis introduced in 1978; the number of the coastal Skuas was not affected because food other than rabbit is available to the Skuas in that area.

B-31324

Odening, K., **Krill—key link in the antarctic food chain** [Krill—Schlüsselglied antarktischer Nahrungsketten], *Urania,* 1984 60(10), p.64-68, In German.

A brief summary is presented of the role krill plays in the antarctic ecosystem. Its morphology and food intake are discussed. Swarming behavior is described and major krill concentrations around the continent are displayed on a chart. The propagation of the species is noted. Factors in exploitation of krill by man are examined.

B-31325

Bannasch, R., **Antarctic seals—at home on or under the ice** [Antarktische Robben—heimisch auf und unter dem Eis], *Urania,* 1984 60(11), p.58-63, In German.

The article describes similarities and differences in physical appearance, behavior, dispositions, and preferred living spaces among the elephant, Weddell, crab-eater, leopard, Ross, and fur seals which inhabit the antarctic regions. Special cold adaptations in some of the species and among the young are noted and discussed.

B-31327

Marschall, S., Mizdalski, E., **Euphausiid larvae in plankton samples from the vicinity of the Antarctic Peninsula, February 1982,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Feb. 1985 No.21, 47p., With German summary. 3 refs.

This report gives the results of the identification of euphausiid larvae caught during the Joint Biological Expedition on RRS *John Biscoe* in February 1982. Sampling was carried out with the RMT 1+8 m and the Nansen-Closing-Net in the region of the Antarctic Peninsula and the Scotia Sea. Larvae of four euphausiid species occurred in this area. *Euphausia superba* was dominant.

B-31328

Piatkowski, U., **Maps of the geographical distribution of macrozooplankton in the Atlantic sector of the southern ocean,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Feb. 1985 No.22, 55p., With German summary. 28 refs.

Macrozooplankton samples were taken during three cruises of the FRV *Walther Herwig* during the austral summers of 1975/76, 1977/78 and 1980/81. The present paper presents maps on the geographic distribution and abundance of the five most frequent macrozooplankton groups in the southern ocean between 30 and 64 deg W, adult krill *(Euphausia superba),* other euphausiids, amphipods, chaetognaths and salps.

B-31329

U.S. Marine Mammal Commission, **Annual report of the Marine Mammal Commission, calendar year 1984; report to Congress,** Washington, D.C., 1985, 173p. (Pertinent p.27-36), Bibliography p.165-173.

The report includes notes of progress through conservation practices in reestablishing endangered species and activities of other conservation groups in antarctic regions. Krill exploitation received much attention; implementing legislation for conserving antarctic marine living resources was passed and signed; the surge of interest in oil and mineral resources was accompanied by a corresponding surge of interest in Antarctica among nations not now party to the Antarctic Treaty; and the status of the catch moratorium for whales scheduled to begin in 1986 is reviewed.

B-31332

Samyshev, E.Z., Lushev, A.I., **Food ration and its components in antarctic krill,** *Oceanology,* 1983 23(6), p.763-766, Translated from Okeanologiia. 7 refs.

During expeditional studies in the Commonwealth Bay in the antarctic summer of 1976-1977, 1977-1978 and 1979-1980 the diets of *Euphausia superba* Dana were calculated from the experimental sum totals of the balance values. The minimum acclimation time to the experimental conditions varied from 6 to 12 hours. The dial periodicity in the metabolic rate and feeding intensity in adults has been established with maxima at noon or at midnight. The threshold food concentration at which feeding was initiated was found to be 0.05/mg. The net conversion efficiency K2 was inversely proportional to weight and decreased from 0.64 down to 0.21 in the krill 16.0-50.0 mm long.

B-31333

Voronina, N.M., **Biomass and production of antarctic krill *(Euphausia superba* Dana),** *Oceanology,* 1983 23(6), p.760-762, Translated from Okeanologiia. 17 refs.

On the macroscale, the average values of primary and secondary production in the regions of dominating copepods and krill are shown to be approximately similar. Hence, the ecological efficiency of the second trophic level, secondary production in the copepod prevalence zone and *P/B* coefficients of these crustaceans and krill have been used for the calculation of krill standing stock in the abundance regions and krill production. When evaluated for the whole Antarctic, the production of copepods appears to be an order higher than that of krill. (Auth.)

B-31334

Lowry, J.K., Stoddart, H.E., **Redescription of Schellenberg's types of *Lysianopsis subantarctica* and *Paralysianopsis odhneri* (Amphipoda, Lysianassidae),** *Crustaceana,* July 1984 47(1), p.98-108, 10 refs.

Schellenberg's types of *Lysianopsis subantarctica* and *Paralysianopsis odhneri* are redescribed. *Lysianopsis subantarctica* is shown to be closely related to *L. holmesi* (J.L. Barnard). The genus *Paralysianopsis* is rediagnosed and placed in the family Lysianassidae sensu stricto. (Auth.)

B-31357

Antezana, T., Ray, K., Morales, C., **Antarctic ecosystem: nature, impact and conservation** [Exosistema antártico: naturaleza, impacto y conservación], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.181-189, In Spanish.

The complexities of the Antarctic Conservation System are discussed and graphically presented: participating institutions, types of involvement, and location of activity. The ecological peculiarities of the antarctic ecosystem are likened to a tree, where the roots represent the phytoplankton, the branches the predators, and krill the trunk uniting both levels of production. The most significant human impacts on the antarctic environment listed are whaling, sealing, the exploitation of krill, mining, and tourism. Among conservation measures suggested are: international cooperation; postponement of mineral and oil exploration until firmer regulations protecting the environment are secured; the capture of living resources to be kept at a minimum; the establishment of a marine sanctuary where the ecological and genetic natural diversities could be maintained.

B-31365

Friedmann, E.I., Ocampo-Friedmann, R., **Endolithic microorganisms in extreme dry environments: analysis of a lithobiontic microbial habitat,** International Symposium on Microbial Ecology, 3rd. Proceedings. Current perspectives in microbiology. Edited by M.J. Klug and C.A. Reddy, Washington, D.C., American Society for Microbiology, 1984, p.177-185, 38 refs.

A survey, limited to endolithic microorganisms in extreme arid environments, including both hot deserts and frigid polar desserts, is described. The study of nannoclimatic parameters explains one of the remarkable features of the antarctic cryptoendolithic microhabitat: in the midst of a truly inhospitable macroenvironment, there exists a microscopic environmental pocket where conditions are comparatively mild. The singular adaptive achievement of the antarctic cryptoendolithic lichens is the change of their growth from the thallose to filamentous, which enables them to penetrate the porous rock substrate.

B-31366

Tschermak-Woess, E., Friedmann, E.I., ***Hemichloris antarctica*, gen. et sp. nov. (Chlorococcales, Chlorophyta), a cryptoendolithic alga from antarctica,** *Phycologia,* 1984 23(4), p.443-453, With German summary. 19 refs.

Hemichloris antarctica gen. et sp. nov. (Oocystaceae, Chlorococcales) is characterized by a single, articulated, pyrenoid-less, thick saucer-shaped chloroplast, which generally, fills less than half of the cell periphery. Multiplication is only by autospores. The species is psychrophilic and is damaged at temperatures above 20C. *Hemichloris antarctica* is a member of the cryptoendolithic microbial community living in porous sandstone rocks of the Antarctic cold desert. It inhabits the zone below that of cryptoendolithic lichens and survives at extremely low light intensities. In the natural habitat, morphology is somewhat different from that in culture, as chloroplasts are smaller and without articulation, and the cells develop a gelatinous sheath. (Auth.)

B-31367

Broady, P.A., **Taxonomic and ecological investigations of algae on steam-warmed soil on Mt. Erebus, Ross Island, Antarctica,** *Phycologia,* 1984 23(3), p.257-271.

Micro-algae and protonematal moss grow on steam-warmed, fumarolic ground at approximately 3500 m altitude on the active volcano Mt. Erebus. Outside fumarolic areas there is no vegetation. Soil surface temperatures are up to 60C and moisture is supplied by condensation of steam. The air temperature in summer is generally between -20 and -30C. The algal flora comprises four species of Cyanobacteria and 11 species and two varieties of Chlorophyta. Three Cyanobacteria, *Mastigocladus laminosus, Phormidium fragile* and an unidentified species of *Lyngbya* grow well at temperatures above 30C both in the laboratory and in the field. The last of these shows the strongest thermophilic response, having good growth at 50C in culture and at up to 59C in the field. The Chlorophyta are all unicellular members of the Chlorococcales with a dominant component of *Chlorella* taxa. These are typical mesophiles. In culture good growth is obtained at 22C and in the field they are rarely observed above 30C. Zonation in the visual appearance of vegetation and in the species composition occurs along the strong temperature gradients where soil surface temperature decreases with increasing distance from the hot steam emissions. The unique structure of this community within Antarctica and its possible airborne origin are discussed. (Auth.)

B-31370

Jacka, T.H., Christou, L., Cook, B.J., **Data bank of mean monthly and annual surface temperatures for Antarctica, the southern ocean, and South Pacific Ocean,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1984 No.22, 97p., 5 refs.

Tables of mean monthly surface temperature and plots of mean annual temperature are presented for most of the permanent Antarctic and southern ocean stations. Because of the geographic sparseness of meteorological stations, particularly in the Pacific sector, data from some more northerly stations are also included. (Auth.)

B-31371

Ikeda, T., Hosie, G., Kirkwood, J., **ADBEX II Cruise krill/zooplankton sampling data,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1984 No.23, 32p., 6 refs.

Body length, wet weight and maturity stage of krill *(Euphausia superba)* collected with RMT and bongo nets during the cruise of MS *Nella Dan* to Prydz Bay, Antarctica in January-February 1984 are reported. Non-krill zooplankton data from RMT samples (density and biomass), and euphausiid larvae (density) data from bongo samples are also presented. (Auth.)

B-31382

Vishniac, H.S., ***Cryptococcus friedmannii,* a new species of yeast from the Antarctic,** *Mycologia,* 1985 77(1), p.149-153, 15 refs.

Cryptococcus friedmannii Vishniac sp. nov. from an antarctic cryptoendolithic community is a psychrophilic basidioblastomycete characterized by cream-colored colonies of cells with smooth, layered walls, budding monopolarly, producing amylose and extracellular proteinase, utilizing nitrate and D-alanine as nitrogen sources and L-arabinose, arbutin, cellobiose, D-glucuronate, maltose, melezitose, salicin, soluble starch, trehalose, and D-xylose as carbon sources. This species differs from all other basidiomycetous yeasts in possessing the following combination of characters: amylose production (positive), assimilation of cellobiose (positive), D-galactose (negative), myo-inositol (negative), D-mannitol (negative), and sucrose (negative). (Auth.)

B-31383

Riemann, F., Schrage, M., **On a mass occurrence of a thraustochytrioid protist (fungi or rhizopodan protozoa) in an antarctic anaerobic marine sediment,** *Bremerhaven. Institut für Meeresforschung. Veroöffentlichungen,* 1983 19(2), p.191-202, With German summary. 29 refs.

A mass occurrence of amoeboid and globular structures, tentatively identified as various developmental stages of a thraustochytrioid protist, was observed in preserved and live subsamples of an Antarctic anaerobic marine sediment. These protists are estimated to represent the greatest part of all microorganisms present in the sample. (Auth.)

B-31387

Fik, M., **Partial purification and some properties of protease from antarctic krill,** *Zeitschrift für Lebensmittel-Untersuchung und -Forschung,* Oct. 1984 179(4), p.296-300, With German summary. 23 refs.

A protease from Antarctic krill ***Euphausia superba,*** Dana 1850 was partially purified by a method involving preparation of an acetone powder, water extraction, ammonium sulfate fractionation, and chromatography on Sephadex G-75. A 106-fold purification of the enzyme with a 76% recovery of activity was achieved. The purified enzyme appeared to be homogeneous on electrophoresis in polyacrylamide gels. The enzyme hydrolyzed hemoglobin at a pH optimum of about 6.2 and a temperature optimum of about 40-45C. The hydrolysis of denaturated bovine hemoglobin by the enzyme was much higher than that of non-denaturated hemoglobin, casein, serum albumin and egg albumin. The Michaelis-Menten constant was found for hemoglobin. The enzyme was inhibited by EDTA, and pCMB and iodoacetamide. (Auth.)

B-31390

Andersen, N.C., **Genera and subfamilies of the family Nototheniidae (Pisces, Perciformes) from the Antarctic and Subantarctic,** *Steenstrupia,* Apr. 10, 1984 10(1), p.1-34, Refs. p.33-34.

A phylogenetic analysis of the family Nototheniidae (Pisces, Perciformes) is given. Development of structural changes in the position of the pectoral foramen, caudal skeleton, cephalic sensory canals, including the number of abdominal and caudal vertebrae was analyzed. The family is divided into 3 subfamilies: Eleginopinae, Nototheniinae and Pleuragramminae. *Notothenia* is divided into 3 subgenera, *Notothenia* Richardson, 1844, *Lepidonotothen* Balushkin, 1976 and *Gobionotothen* Balushkin, 1976. Based on reductions in the cephalic sensory canals and the development of pitlines, 3 species of *Trematomus: T. tokarevi, T. hansoni* and *T. bernacchii* were transferred to *Pagothenia.* Some species were transferred among subfamilies and subgenera. The controversial scapular foramen of *Tremato*[illegible] and *Pagothenia* was reinterpreted and is still considered plesiomorphic. A historical biogeographical treatment is given. (Auth. mod.)

B-31398

Ohyama, Y., **Mites around Syowa Station,** *Polar news,* Feb. 1984 No.38, p.15-19, In Japanese.

Two species of free living mites occur in the ice free areas around Showa Station. These are *Nanorchestes antarcticus* and *Tydeus erebus,* both of which are widely distributed from coastal areas to inland nunataks. The mites are found in the surface layer of moist sandy soil and moss or algal communities. Their habitat preferences are different from each other. *T. erebus* is mostly found in association with vegetation of moss or algae. On the other hand, *N. antarcticus* occurs in sandy soil without visible vegetation. The highest population density of mites occurring in sandy soil was observed where the moisture content of their habitats was higher. A series of samplings in several sites was made on the bank of a pond at intervals of one meter. Peak density was found two or three meters from the water's edge where the moisture content was about seven per cent. To measure the optimal temperature for these mites, walking speed was observed under various environmental temperature conditions. It became clear that mites were most active in the range from 8 to 18 C.

B-31406

Witas, H., Gabryelak, T., Matkovics, B., **Comparative studies on superoxide dismutase and catalase activities in livers of fish and other antarctic vertebrates,** *Comparative biochemistry and physiology,* 1984 77C(2), p.409-411, 25 refs.

The activities of superoxide dismutase and catalase in livers of fish and other antarctic vertebrates were examined. Significant differences between superoxide dismutase activities in livers of white-blooded and red-blooded fish species were observed. Superoxide dismutase seems to be involved more than catalase in protection processes against cell damage caused by oxygen free radicals. (Auth.)

B-31415

Cárdenas, J.C., **International interest in marine mammals** [Los mamíferos marinos en el interés internacional], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.8-10, In Spanish.

The highlights of two international events, the 36th annual session of the International Whaling Commission and the first reunion of the Group of Specialists on Marine Mammals of South America, both held in Buenos Aires, Argentina, are reviewed from a conservational perspective.

B-31416

Yáñez, J., Núñez, H., **Ecological study of three species of penguins** [Estudio ecológico de tres especies de pingüinos], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.11, In Spanish.

A study in progress of three species of penguins from the South Shetland Islands, *Pygoscelis adeliae, P. antarctica,* and *P. papua,* is reported. Observation of the birds around the clock showed their preference for joining the colony during the afternoon and night hours.

B-31424

Kerley, G.I.H., **Relative population sizes and trends, and hybridization of fur seals *Arctocephalus tropicalis* and *A. gazella* at the Prince Edward Islands, Southern Ocean,** *South African journal of zoology,* Nov. 1983 18(4), p.388-392, With Afrikaans summary. 17 refs.

Fur seals were counted at the Prince Edward Islands during the 1981/1982 austral summer. Classified counts, adjusted for pup undercounting and mortality, pregnancy rate and seasonal haulout patterns are presented. These populations have entered a phase of rapid growth, as indicated by higher rates of population growth than previously found. The possible role of *A. gazella* immigration is unknown. There has been an increase in the number of breeding localities used by both species. At present the extent of hybridization between these two species appears limited, possibly by behavioural, ecological and genetic processes. (Auth.)

B-31425

Blankley, W.O., **Feeding ecology of three inshore fish species at Marion Island (Southern Ocean),** *South African journal of zoology,* 1982 17(4), p.164-170, With Afrikaans summary. 20 refs.

DLC QL337.S65Z64

The diets, morphological features and habitats of 258 specimens of the three inshore fish species *Notothenia coriiceps, N. macrocephala* and *Harpagifer georgianus* from Marion Island are described and compared. Correspondence analysis of the three diets shows the existence of three clearly defined feeding niches despite the occurrence of some common prey species. Inter- and intraspecific similarities and differences in the diets of small and large size classes of each species are also displayed by correspondence analysis. Size-limited predation by *N. coriiceps* of the limpet *Nacella delesserti* is described. Differences in the habitats occupied by the fish appear to be important in determining the species composition of their diets. (Auth.)

B-31440

Baharaeen, S., Vishniac, H.S., ***Cryptococcus lupi* sp. nov., an antarctic basidioblastomycete,** *International journal of systematic bacteriology,* Apr. 1982 32(2), p.229-232, 16 refs.

Cryptococcus lupi sp. nov. was isolated from soil samples from the Dry Valleys of South Victoria Land. The guanine-plus-cytosine content of *C. lupi* deoxyribonucleic acid differs from the guanine-plus-cytosine contents of biotypes originally described under the name *Cryptococcus vishniacii.* The type strain of *C. lupi* differs phenotypically from the type strain of *C. vishniacii* it also differs by having a higher maximum growth temperature and in its cell size and ratio of cell width to length. (Auth. mod.)

B-31444

Fricke, H., Gercken, G., Schreiber, W., Oehlenschläger, J., **Lipid, sterol and fatty acid composition of antarctic krill (*Euphausia superba* Dana),** *Lipids,* Nov. 1984 19(11), p.821-827, 44 refs.

The lipid classes, fatty acids of total and individual lipids and sterols of Antarctic krill from two areas of the Antarctic Ocean were analyzed by thin layer chromatography (TLC), gas liquid chromatography (GLC) and gas liquid chromatography/mass spectrometry (GLC/MS). Basic differences in the lipid composition of krill from the Scotia Sea (caught in Dec. 1977) and krill from the Gerlache Strait (caught in Mar. 1981) were not observed. The main lipid classes found were: phosphatidylcholine, phosphatidylethanolamine, triacylglycerol, free fatty acids, and sterols. Wax esters and sterol esters were present only in traces. More than 50 fatty acids could be identified using GLC/MS. (Auth. mod.)

B-31445

O'Sullivan, D., **Description of *Rathkea lizzoides* sp. nov. (Hydromedusae: Rathkeidae) from Antarctica and a key to the genus,** *Journal of natural history,* Nov.-Dec. 1984 18(6), p.861-868, 11 refs.

The new species described here is characterized by its rounded bell-shaped form, being almost as broad as high, the presence of an apical dome and a gastric peduncle, the 4 unbranched oral arms, the number of nematocyst clusters (7 to 18 in specimens 1.5 mm or greater in height), the occasional presence of 1 or more nematocyst clusters near the mouth margin, the 5 to 7 tentacles in each perradial tentacular bulb, the 3 to 5 tentacles in each interradial tentacular bulb, and the ovoid shape of the tentacular bulb. A key to the known species of *Rathkea* is provided. (Auth.)

B-31446

Croxall, J.P., Everson, I., Kooyman, G.L., Ricketts, C., Davis, R.W., **Fur seal diving behavior in relation to vertical distribution of krill,** *Journal of animal ecology,* Feb. 1985 54(1), p.1-8, 23 refs.

Continuous records of diving depths of female Antarctic fur seals on 3-8 day feeding trips to sea from South Georgia were analysed in conjunction with data on diet changes in the abundance and distribution of their main prey, krill. In 36 complete days' foraging by seven seals, 75% of 4273 dives were at night. Dives then were consistently shallower (dive depth <30 m) than in daytime (mostly 40-75 m). This closely matched changes in the vertical distribution of krill, nearly all of which was below a depth of 50 m from 09.00-15.00 h, with substantial quantities above 40 m only between 21.00-06.00 h. Although over 40% of krill in the water column at any time of day was below 75 m, only 3% of dives exceeded this depth. It is suggested that because krill migrate vertically fur seals are able to exploit them most efficiently during shallow dives at night. (Auth.)

B-31456

Thiriot-Quiévreux, C., **Chromosome analysis of three species of *Mytilus* (Bivalvia: Mytilidae),** *Marine biology letters,* Sept. 1984 5(5), p.265-273, 16 refs.

The quantitative analysis of karyotypes of *M. galloprovincialis* (Mediterranean species), *M. edulis* (Atlantic species) and *M. desolationis* (sub-Antarctic species) was carried out to add karyological criteria for the diagnosis of *Mytilus* sp. and ssp. The karyotypes (2n = 28) of these 3 species show a similar pattern consisting of 5 size groups. Following the nomenclature of Levan et al. (1964) for the position of the centromere, a classification for each chromosome pair is given. Taxonomic separation of *Mytilus* sp. is discussed according to the results obtained. (Auth. mod.)

B-31457

Bekoff, M., **Field study of the development of behavior in Adélie penguins: univariate and numerical taxonomic approaches,** Development of behavior: comparative and evolutionary aspects. Edited by G.M. Burghardt and M. Bekoff, New York, Garland STPM, 1978, p.177-202, Refs. p.198-202.

DLC QL750.D39

A study dealing with processes of behavioral development in Adélie penguin chicks is described. Chick and adult behavioral patterns are compared from the following points of interest: the ways in which individual motor acts became incorporated into behavioral sequences during ontogeny, the ways in which the behavior of chicks changed during early ontogeny (before fledging), and the relationship between behavioral variability and age. The use of some quantitative procedures in ethological research are also discussed.

B-31459

Blankley, W.O., **Marine food of Kelp Gulls, Lesser Sheathbills and Imperial Cormorants at Marion Island (Subantarctic),** *Cormorant,* 1981 Vol.9, p.77-84, 10 refs.

The Kelp Gulls feed mainly on marine animals but also scavenge and prey on terrestrial invertebrates. The terrestrial Lesser Sheathbills are wide niched feeders which use the intertidal zone as one of their feeding habitats. Imperial Cormorants feed exclusively on marine species and this study is only a preliminary assessment of their diet. The inshore marine environment is thus important to the livelihood of these three avian species and the aim of this study is to describe their trophic relationships with sea life. The work presented here is part of an ongoing project investigating the marine food web operative at Marion Island shores. (Auth.)

B-31464

Martin, IU.L., **Problem of extremity in the ecology of cryptogamic plants** [Problema ekstremal'nosti v ekologii nizshikh rasteniĭ], Flora i gruppirovki nizshikh rasteniĭ v prirodnykh i antropogennykh ekstremal'nykh usloviiakh sredy (Flora and groupings of lower plants in natural and anthropogenous extreme environmental conditions) edited by J. Martin, Tallin, 1984, p.9-19, In Russian. 28 refs.

The differences between the lichen distribution in western and eastern parts of Antarctica are discussed and tabulated. Leading ecological factors of the antarctic cold deserts are large diurnal and seasonal variations of temperature, physiological aridity, intensive ultraviolet radiation and strong winds. Accordingly, the lichens have attained special morphological and ecophysiological adaptations. Desiccation resistance and cold resistance of antarctic lichens are very high. The lichens can remarkably alter the temperature regime of their substrates. Desiccated lichen thalli are able to begin photosynthesis immediately after the uptake of water vapour from the air. The lichens can be active even under the snow cover. Many of the antarctic crustose lichen species have convex or hemisphere-like areols, with twice the surface area of the flat ones. As the volume of convex areols increases faster than surface, this adaptation is ecologically profitable for nutrient accumulation and storage, as well as gas exchange and illumination. Important adaptations are the endolithic growth form and dark colour of the thalli. (Auth. med.)

B-31466

Noble, E.R., **Ecologic aspects of protozoan infections in antarctic fishes,** *Journal of protozoology,* Nov. 1984 31(4), p.575-577, 9 refs.

Most of the protozoa reported in this study were obtained from nototheniid fishes. No protozoa and few, if any, other parasites were recovered from 173 midwater fishes collected from outside of the continental shelf. Differences in infections in different localities and depths are due to many ecologic factors needing much more study of their relations to parasitism. These factors include temperatures, salinities, densities of fish populations, food and feeding habits, migrations of adult and immature fishes, availability of potential intermediate hosts, and marine "snow." (Auth. mod.)

B-31467

Vishniac, H.S., ***Cryptococcus socialis*** **sp. nov. and** ***Cryptococcus consortionis*** **sp. nov., antarctic basidioblastomycetes,** *International journal of systematic bacteriology,* Jan. 1985 35(1), p.119-122, 22 refs.

New yeasts from the Ross Desert include *Cryptococcus socialis* sp. nov. and *Cryptococcus consortionis* sp. nov. *Cryptococcus socialis* requires no vitamins, assimilates L-arabinose, cellobiose, D-glucuronate, maltose, melezitose, raffinose, soluble starch, sucrose, and trehalose, and may be distinguished from all other basidioblastomycetes by the combination of amylose production, cellobiose assimilation, and failure to utilize nitrate, D-galactose, *myo*-inositol, and mannitol. Its guanine-plus-cytosine content is 56 mol%. *Cryptococcus consortionis* requires thiamine, assimilates L-arabinose, D-glucuronate, 2-ketogluconate, salicin, succinate, sucrose, trehalose, and D-xylose, and may be distinguished from all other basidioblastomycetes by the combination of amylose production and failure to utilize nitrate, cellobiose, D-galactose, *myo*-inositol, and mannitol. Its guanine-plus-cytosine content is 56 mol%. (Auth.)

B-31471

Hunter, S., **Movements of giant petrels** ***Macronectes*** **spp. ringed at South Georgia,** *Ringing and migration,* Oct. 1984 5(2), p.105-112, 12 refs.

More than two hundred recoveries of giant petrels *Macronectes halli* and *M. giganteus* originally ringed at Bird Island, South Georgia, were analysed to determine the nature of any interspecific differences in the locality, timing and circumstances of recovery. Normally about 3% of the nestlings ringed were recovered within three years of fledging but the recovery rate was significantly lower in nestlings ringed in 1978-80. Eighty percent of the recoveries occurred within 12 months of ringing. Proportionately more *M. halli* are recovered in South America and the Pacific. The numbers recovered in southern Africa have declined whilst birds were recovered more frequently in New Zealand in 1978-80, compared to earlier years. Only one bird ringed as an adult has been recovered away from South Georgia. Details of foreign-ringed birds and local movements are also included. Differences between the two species are discussed in relation to weather and fledging dates. (Auth.)

B-31490

Neori, A., Holm-Hansen, O., Mitchell, B.G., Kiefer, D.A., **Photoadaptation in marine phytoplankton,** *Plant physiology,* Oct. 1984 76(2), p.518-524, 30 refs.

The optical properties of marine phytoplankton were examined by measuring the absorption spectra and fluorescence excitation spectra of chlorophyll *a* for natural marine particles collected on glass fiber filters. Samples were collected at different depths from stations in temperate waters of the Southern California Bight and in polar waters of the Scotia and Ross seas. At all stations, photoplankton fluorescence excitation and absorption spectra changed systematically with depth and vertical stability of the water columns. In samples from deeper waters, both absorption and chlorophyll *a* fluorescence excitation spectra showed enhancement in the blue-to-green portion of the spectrum (470-560 nm) relative to that at 440 nm. Since similar changes in absorption and excitation were induced by incubating sea water samples at different light intensities, the changes in optical properties can be attributed to photoadaptation of the phytoplankton. In the natural populations studied, shade adaptation caused increases in the concentration of photosynthetic accessory pigments relative to chlorophyll *a*. These changes in cellular pigment composition were detectable within <1 day. Comparisons of absorption spectra with fluorescence excitation spectra indicate an apparent increase in the efficiency of sensitization of chlorophyll *a* fluorescence in the blue and green spectral regions for low light populations. (Auth.)

B-31492

Astheimer, L.B., Grau, C.R., **Apparent double blastoderms in Adélie penguin eggs,** *Condor,* Feb. 1985 87(1), p.150-151, 12 refs.

The cause of the apparent double blastoderms in penguins cannot be determined with the information available in this study. However, several possibilities are suggested, among them a genetic factor due to the high incidence of double blastoderms in the population, coupled with the nonrandom occurrence in individual females. Attention is drawn to the potential information which may be gained by examining both eggs which fail to hatch and fresh eggs in studies of the reproductive biology of wild birds.

B-31499

Doucette, G.J., Burghardt, R.C., Fryxell, G.A., **Genus** ***Thalassiosira:*** **protoplast ultrastructure of the bipolar diatom** ***Thalassiosira antarctica,*** *Canadian journal of botany,* July 1984 62(7), p.1513-1522, With French summary. 24 refs.

Disjunct populations of vegetative and resting stages of the bipolar diatom *T. antarctica* Comber were examined for differences in protoplast ultrastructure. Analysis of clonal cultures from northern and southern populations revealed differences of uncertain taxonomic value between vegetative cells. Several unique ultrastructural features were noted in members of both populations. Most notable were complex corelike structures and intramembrane particle arrays, not previously observed in diatoms, occurring in certain vesicles. Also, dictyosomes exhibited an apparent reversal in polarity with respect to width and staining intensity of luminal spaces. These and other ultrastructural characteristics are considered in relation to protoplasts of other *Thalassiosira* species and diatoms in general. (Auth.)

B-31500

Brothers, N.P., **Breeding, distribution and status of burrow-nesting petrels at Macquarie Island,** *Australian wildlife research,* 1984 11(1), p.113-131, Refs. p.130-131.

A survey of burrow-nesting petrels on Macquarie I between 1975 and 1982 confirmed breeding of the white-headed petrel, blue petrel, antarctic prion, fairy prion, sooty shearwater and common diving petrel. A further six species were recorded. The population size of all burrow-nesting petrels has been adversely modified by alien fauna introduced last century. Of the six species breeding, one is stable, two are diminishing and three are present in very low numbers. Current deterioration of their status is localized and with proper management there may be recovery, particularly of the three last species. (Auth.)

B-31504

Guinot, D., **Bathyal crabs from Reunion Island: Description of *Cyrtomaia guillei* sp. nov., :*Platypilumnus inermis* sp. nov., and *Psopheticus vocans* sp. nov. (Crustacea Decapoda Brachyura)** [Crabes bathyaux de l'île de La Réunion: description de *Cyrtomaia guillei* sp. nov., de *Platypilumnus inermis* sp. nov. et de *Psopheticus vocans* sp. nov. (Crustacea Decapoda Brachyura)], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.7-31, In French with English summary. Refs. p.25-27.

The finding of several species of Brachyura, rare or new, in waters 100-4000 m deep, by *Marion-Dufresne* cruising around Reunion Island is reported. Among the findings, *Cyrtomaia guillei* sp. nov. was added to the twenty bathyal species of the genus *Cyrtomaia* Miers already known. In addition, *Cyrtomaia goodridgei* McArdle, not found since 1905, is redescribed and illustrated by the original material from Andaman Islands. The monospecific genus *Platypilumnus* Alcock is credited with a second species, *P. inermis* sp. nov. Owing to the capture of several typical *Psopheticus stridulans* Wood-Mason, a new species can be described: *Psopheticus vocans* sp. nov. (Auth. mod.)

B-31505

Crosnier, A., **Cruise MD 32 of the *Marion Dufresne* to Reunion Island. Portunidae (Crustacea Decapoda Brachyura)** [Campagne MD 32 du *Marion Dufresne* à La Réunion. Portunidae (Crustacea Decapoda Brachyura)], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.33-36, In French with English summary. 9 refs.

Ten species of Portunidae, the list of which is given, have been collected during the *Marion Dufresne* cruise MD 32 around Reunion Island. Among them, seven had never been reported from Reunion Island and one, *Portunus dubius* (Laurie, 1906), had never been collected in the western Indian Ocean. (Auth.)

B-31506

Moosa, M.K., **Notes on stomatopod crustacea from La Réunion and Mauritius,** *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.37-90, With French summary. 21 refs.

Five species of Stomatopoda have been collected during the *Marion Dufresne* cruise MD 32 around Reunion Island. Two of them had never been reported from Reunion Island or Mauritius bringing the number of species of Stomatopoda known from this area to 26. The list of these species is given. (Auth.)

B-31508

Duchêne, J.C., **Descriptive data on the Annelid macrobenthos in Morbihan Bay, Kerguelen** [Données descriptives sur le macrobenthos annélidien dans le Golfe du Morbihan, Kerguelen], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.75-94, In French with English summary. 26 refs.

Several campaigns were led in Kerguelen during 1977-1981. The purpose of the samplings was to look for certain species, like *Thelepus setosus* or *Neoleprea streptochaeta,* to study their biology and reproduction. The hydrology and populations in the sampling stations are described. Typical annelid populations in the main sampling stations are presented. (Auth.)

B-31509

D'Hondt, J.L., **New contribution to understanding marine Bryozoa in French austral territory** [Nouvelle contribution à la connaissance des bryozoaires marins des terres australes françaises], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.95-116, In French with English summary. 34 refs.

A study of Ctenostomatous and Cheilostomatous (Anascina) Bryozoa from South Indian Ocean (Crozet and Kerguelen Islands) and South Atlantic (Bouvet Island) is reported. Four new species *Neocellariaeforma elongata, Melicerita subantarctica, Mawsonia calveti* and *Menipea columnaris,* and the new genus *Neocellariaeforma,* are described.

B-31510

Cantera, J.R., Arnaud, P.M., **Prosobranch gastropods of Kerguelen and Crozet Islands (southern Indian Ocean). Ecologic comparison and biological peculiarities** [Les gastéropodes prosobranches des îles Kerguelen et Crozet (sud de l'océan Indien). Comparaison écologique et particularités biologiques], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.56, 169p., In French with English and Spanish summaries. Refs. p.149-153.

A total of 130 species of prosobranch gastropods were found in two faunas studied, of which 12 are new to science and 30 are new to Kerguelen Islands. All records for Crozet Islands are new; the gastropod fauna is scarce. The species are characterized by their small size and their white, brittle and poorly-ornamented shells, as a result of a reduced metabolism of calcium carbonate, are linked to poor terrigenous inputs and low water temperatures. Furthermore, carnivorous species are dominant. In spite of their apparent isolation, Kerguelen and Crozet Island Prosobranch faunas are strongly related to antarctic (particularly East Antarctica) and other subantarctic faunas. Prosobranch dispersion has been favored by the monotony of environmental conditions in the whole subantarctic region and also by their transportation by floating kelps and by migration. Their biological peculiarities, specifically the high frequency of direct development (or lack of pelagic larval stages) and opportunistic diet, enable these prosobranchs to settle in new areas. (Auth. mod.)

B-31511

Makarov, R.R., Serebriakova, M.V., Soliankin, E.V., **Phytoplankton drift transport and distribution in the vicinity of South Georgia Island,** *Oceanology,* 1984 24(1), p.110-115, 13 refs. Translated from Okeanologiia.

The distributions of phytoplankton as a whole and those of separate dominant diatom species were analyzed from the collections taken by the *Akademik Knipovich* in the vicinity of South Georgia in May, 1981. Two species, *Thalassiothrix antarcticus* and *Chaetoceros criophilus,* were numerically dominant (the values varied from 0.001 to 2.7 ml/cu m). The peak abundance of these species tended to be confined to the relatively clean water of the West Wind Drift and the Weddell Sea water core. The 3rd sp., *Corethron criophilum,* prevailed in highly transformed Weddell Sea water. The rather mosaic distribution of phytoplankton dominant forms suggests an intensive interaction and penetration of the antarctic waters of various origin.

B-31512

Meyer, M.C., Burreson, E.M., **Redescription of the piscicolid leech *Trulliobdella capitis* Brinkmann,** *Helminthological Society of Washington. Proceedings,* Jan. 1983 50(1), p.138-142, 3 refs.

The antarctic leech *T. capitis* Brinkmann, 1947 is redescribed based on recently collected specimens and subsequent re-examination of the type material. The leech possesses three pairs of tentacles on the oral sucker, up to 14 ocelli on the caudal sucker, 11 pairs of pulsatile vesicles, esophageal diverticula, six pairs of cleft crop ceca, postceca with four pairs of cleft lateral ceca, and five pairs of testisacs. (Auth.)

B-31567

Kamenev, V.M., **Adaptive peculiarities of the breeding cycle of some antarctic birds** [Adaptivnye osobennosti tsikla razmnozheniia nekotorykh antarkticheskikh ptits], Vsesoiuznoe soveshchanie po adaptatsii organizmov k usloviiam Kraĭnego Severa, Tallin, Nov. 27-30, 1984. Tezisy dokladov (All-Union conference on adaptation of organisms to the Arctic environment, Tallin, Nov. 27-30, 1984. Proceedings) edited by I. Levengarts and N. Semenova, Tallin, 1984, p.72-76, In Russian.

Study of climatic conditions in bird colonies nesting on Haswell Is. and King George I. during their entire reproductive cycle showed those islands to be a favored location for bird breeding over other antarctic areas. The physiology and behavior of penguins and other antarctic birds and their young are discussed in the light of their adaptation to the harsh antarctic environment.

B-31568

Martin, IU.L., **Biogeochemical adaptations of cryptogams to natural extreme environments** [Biogeokhimicheskie aspekty adaptatsii nizshikh rasteniĭ k ekstremal'nym prirodnym usloviiam], Vsesoiuznoe soveshchanie po adaptatsii organizmov k usloviiam Kraĭnego Severa, Tallin, Nov. 27-30, 1984. Tezisy dokladov (All-Union conference on adaptation of organisms to the Arctic environment, Tallin, Nov. 27-30, 1984. Proceedings) edited by I. Levengarts and N. Semenova, Tallin, 1984, p.95-100, In Russian. Refs. p.99-100.

The literature on the physiology, ecology, geographic distribution, biochemistry and acclimatization of antarctic lichens is reviewed, showing their capability to survive even under layers of ice and snow. A study, conducted on specimens collected in the Prince Charles Mountains in 1971-1972 shows that lichens thrive better within and under rocks, than on their surface, due to more suitable moisture and temperature conditions. The pedogenic activity of lichens, especially the effect on mineral formation and changes, is discussed.

B-31570

Parin, N.V., Kukuev, E.I., **Reestablishment of the validity of *Lampris immaculata* Gilchrist and the geographical distribution of Lampridae,** *Journal of ichthyology,* 1983 23(1), p.1-12, Translated from Voprosy ikhtiologii. Refs. p.11-12.

On the basis of a study of three opah specimens, caught in the Scotia Sea north of the Falklands and in the southeastern Pacific and of an analysis of supplementary reports and published data, the existence of two species in the genus *Lampris,* previously considered monotypic, is shown. One of the species, *L. guttatus,* is widespread in the world ocean; the second, for which the name *L. immaculatus* is reinstated, is encountered only in the high and middle latitudes of the Southern Hemisphere. The main diagnostic differences between the species are body shape and coloration, body depth and relative position of pectoral and pelvic fins. (Auth.)

B-31571

Naumov, A.G., Svetlov, M.F., Kozlov, A.N., Pinskaia, I.A., **Some peculiarities of distribution and feeding of *Notothenia guentheri* (Nototheniidae),** *Journal of ichthyology,* 1983 23(1), p.149-151, Translated from Voprosy ikhtiologii. 6 refs.

A group of fish of the family Nototheniidae lives in the Falkland-Patagonia region (Norman, 1937), whose biology has remained practically unstudied. Now another notothenia has been found in the Antarctic waters in the Falkland-Patagonia region, *N. guentheri.* It confirms the existing information about a close relationship between the Patagonian and Antarctic ichthyofauna (Andriyashev, 1964; Permitin, 1977). This species from *brevicauda* group, which was first described by Norman (1937), has been included under genus *Patagonotothen* by Balushkin (1976) on the basis of several morphological characters. (Auth. mod.)

B-31572

Kozlov, A.N., Sil'ianova, Z.S., **Physiological-biochemical peculiarities of gonad maturation of marbled notothenia, *Notothenia rossi marmorata* (Nototheniidae),** *Journal of ichthyology,* 1983 23(2), p.169-172, Translated from Voprosy ikhtiologii. 8 refs.

A study characterizing the changes in chemical composition of the gonads of marbled notothenia in the process of their maturation during the annual cycle is presented. Four stages are identified. Specimens were collected during five cruises of the research ship *Akademik Knipovich* in the shelf waters off South Georgia.

B-31574

Huneck, S., Sainsbury, M., Rickard, T.M.A., Smith, R.I.L., **Ecological and chemical investigations of lichens from South Georgia and the maritime Antarctic,** *Hattori Botanical Laboratory. Journal,* May 1984 No.56, p.461-480, Refs. p.478-480.

The chemistry of 20 lichen taxa from localities on the subantarctic island of South Georgia and in the maritime Antarctic is described, including the isolation of two new depsides from *Pseudocyphellaria endochrysea,* and a brief account of the ecology of each taxon is also provided. (Auth.)

B-31576

Yoshida, J., Furuuchi, T., Nakamura, R., **Metabolizable energies of dry boiled krill *(Euphausia superba)* for chickens,** *Japanese poultry science,* July 1983 20(4), p.271-274, In Japanese with English summary. 13 refs.

Metabolizable energies of dry boiled krill and its defatted material for chicken were determined. Chemical composition in dry matter of dry boiled krill was as follows: crude protein 53.9%, crude fat 12.3%, nitrogen free extracts 18.8%, crude fiber 3.0%, crude ash 12.1%. Metabolizable energy of dry boiled krill for chicken was 2.76 Mcal/kg DM and energy metabolizability was 49.8%, and digestibility of crude protein was 80.0%. Metabolizable energy of the crude fat calculated from metabolizable energy of its defatted material (1.905 Mcal/kg DM) was 9.03 Mcal/kg. (Auth.)

B-31579

Wynn-Williams, D.D., **Biota of a lateral moraine and hinterland of the Blue Glacier, South Victoria Land, Antarctica,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.1-5, 6 refs.

The region around Blue Glacier previously reported to have supported carpets of moss has been reexamined. Most of these mosses are in fact algae and lichens with only one true moss being identified. Sketch maps accompany the text and point out the areas amongst the meltwater pools and moraines where algae and lichens flourish.

B-31580

Copestake, P.G., Croxall, J.P., **Aspects of the breeding biology of Wilson's storm petrel *Oceanites oceanicus* at Bird Island, South Georgia,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.7-17, 27 refs.

The breeding timetable of Wilson's storm petrel at Bird I. is similar to that at Signy I. and significantly later than at the Argentine Is. and Terre Adélie; possible reasons for this are discussed. At South Georgia, breeding females are significantly larger than males in all characters, and a discriminant analysis using wing, bill and tarsus length correctly classified 85% of females and 94% of males. South Georgia birds are smaller than those from further south, but the differences suggest clinal variation rather than a disjunct pattern and it may be inadvisable to recognize any subspecies, although more data are needed from the northernmost breeding populations. (Auth.)

B-31581

Smith, H.G., **Colonization of volcanic tephra on Deception Island by protozoa: long-term trends,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.19-33, 16 refs.

Samples of volcanic tephra were collected in 1981 and 1984 from sites on Deception Island which had been studied between 1968 and 1973 following eruptions in 1967, 1969 and 1970. An area unaffected by volcanic activity since before 1829 on Fumarole Bay was also sampled. The protozoa from these sites were determined and the results compared with those of earlier studies. Twenty-three species of Protozoa (5 flagellates, 2 naked rhizopods, 4 testate rhizopods and 12 ciliates) were observed in addition to the 13 species recorded previously. It is concluded that the processes of microbial colonization of sterile tephra were initiated within 1 year of deposition with the first protozoan species appearing after 10 months. The rate of increase in numbers of protozoan species in unvegetated tephra was most directly associated with the rate of accumulation of organic matter, though there was also evidence that species numbers showed some increase with the passage of time without any increase in organic content. (Auth. mod.)

B-31582

Cranston, P.S., ***Eretmoptera murphyi* Schaeffer (Diptera: Chironomidae), an apparently parthenogenetic antarctic midge,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.35-45, 17 refs.

Chironomid midges are amongst the most abundant and diverse holometabolous insects of the Antarctic and sub-Antarctic. *Eretmoptera murphyi* Schaeffer, 1914, has been enigmatic to systematists since the first discovery of adult females on South Georgia. The rediscovery of the species as a suspected introduction to Signy Island (South Orkney Islands) allows the description of the immature stages for the first time and the redescription of the female, the only sex known. *E. murphyi* larvae are terrestrial, living in damp moss and peat, and the brachypterous adult is probably parthenogenetic. *Eretmoptera* appears to have an isolated position amongst the terrestrial Orthocladiinae: the close relationship with the marine Clunio group of genera suggested by previous workers is not supported.

B-31583

Smith, R.I.L., ***Nothofagus* and other trees stranded on islands in the Atlantic sector of the southern ocean,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.47-55, 16 refs.

The occurrence of driftwood, predominantly of southern South American provenance, on Beauchêne Island, South Georgia, the South Sandwich and the South Shetland islands, is reported. Of 56 specimens examined most belonged to species of southern beech, *Nothofagus,* particularly *N. pumilio.* The importance of such driftwood on remote islands is discussed with regard to its potential for transporting terrestrial organisms over great distances and serving as possible agents of biological immigration and colonization. (Auth.)

B-31584

Osborne, B.C., **Aspects of the breeding biology and feeding behaviour of the brown skua *Catharacta lonnbergi* on Bird Island, South Georgia,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.57-71, 18 refs.

Eggs were laid over a six-week period, with a mean laying date of 26 November. The incubation period was 29 days for both first- and second-laid eggs. First-hatched chicks were heavier than second-hatched chicks throughout the growth period and single chicks were similar to first hatched chicks. Overall survival from eggs laid to chicks fledged was 71% (egg survival 82%, chick survival 87%). Within the population local differences exist in the timing of the breeding cycle and these might relate to variations in local prey availability. Skuas were seen to use a variety of techniques to take a wide range of prey species. From an analysis of midden remains, dove prions, penguins (especially macaroni penguins) and common diving petrels, were the most important prey species overall, but significant local variations existed, especially in the importance of seal-derived material. (Auth.)

B-31586

Enticott, J.W., O'Connell, M., **Distribution of the spectacled form of the white-chinned petrel *(Procellaria aequinoctialis conspicillata)* in the South Atlantic Ocean,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.83-86, 9 refs.

The *conspicillata* subspecies of the white-chinned petrel is one of the rarest seabird taxa in the South Atlantic. Its population stands at about 1,000 breeding pairs all inhabiting Inaccessible Island during mating season. Sightings of this subspecies are listed and analyzed.

B-31588

Le Maho, Y., Dewasmes, G., **Energetics of walking in penguins,** Seabird energetics, edited by G.C. Whittow and H. Rahn, New York, Plenum Press, 1984, p.235-243, 18 refs.

DLC QL698.S364 1984

The cost of walking must be considered as an important proportion of the energy budget of penguins because for most species the breeding colonies are not close to the sea. Like some other birds, penguins have a peculiar walking gait which is called waddling. Their legs are relatively short and their body undergoes large lateral displacements at each stride. In addition, penguins feed only at sea, as do many other marine animals. Thus they are fasting while coming ashore for breeding or molting. Interesting questions therefore arise within this context. What are the changes in the cost of walking with variations in speed of locomotion, and what is the cost of walking at a given speed for a large penguin by comparison with a smaller one? Does it cost the same energy for walking at the same speed at the beginning and at the end of the periods of fasting? Does it cost more to waddle and what are the distances penguins may cover by walking? (Auth. mod.)

B-31589

Davis, R.W., Kooyman, G.L., **Free-ranging energetics of penguins,** Seabird energetics, edited by G.C. Whittow and H. Rahn, New York, Plenum Press, 1984, p.245-284, Refs. p.279-284.

DLC QL698.S264 1984

A review is given of research done over the last two decades on the at-sea metabolism of a wide range of penguin species. Differences are compared in methods of measurements of penguins ashore walking, resting, fasting, incubating, or moulting and penguins foraging at sea. Most of the published papers treat Macaroni, Gentoo, and King Penguins which breed sympatrically on South Georgia Island.

B-31590

Croxall, J.P., Ricketts, C., Prince, P.A., **Impact of seabirds on marine resources, especially krill, of South Georgia waters,** Seabird energetics, edited by G.C. Whittow and H. Rahn, New York, Plenum Press, 1984, p.285-315.

DLC QL698.S364 1984

In developing a model of the impact of seabirds on krill, the populations studied were breeding pairs residing on Bird Island off South Georgia and include four penguin species, four albatrosses, seven petrels, two storm petrels, two diving petrels, one shag, and one tern. To estimate the annual food consumption requires knowledge of the population size, dietary composition, and energy requirement on each day of the year for each species. Because size, activity patterns, and energy requirements of the two sexes may differ, each sex is assessed separately. Data for these parameters are compiled, assembled, analyzed, and discussed. (Auth. mod.)

B-31602

Pascoe, J.G., **Census of the South Polar Skua at Cape Hallett, Antarctica,** *Notornis,* Dec. 1984 31(4), p.312-319, 5 refs.

Two counts of skuas at Cape Hallett were made between 17 and 20 January 1983: in one 85 pairs and 83 non-breeding birds, total 253 birds; in the other, 83 pairs and 79 non-breeding birds, total 245 birds. South Polar Skua numbers remain low, suggesting a continuation of the 1960s decline or the influence of climatic factors such as heavy snowfall during critical stages of skua breeding. (Auth.)

B-31603

Andreev, A.N., Veselov, IU.S., **Equipment for electro-coagulation of proteins** [Apparaty dlia elektrokoaguliatsii belkov], *Rybnoe khoziaĭstvo,* March 1984 No.3, p.63-65, In Russian.

A method is recommended for obtaining food protein from krill juice. Proteins are coagulated in a direct current electric field (10-80 V/cm). Electro-coagulators with a homogeneous and heterogeneous electric field were constructed and are described in detail. Models were tested under laboratory conditions, and the following advantages of electro-coagulation of protein were established: no steam is required; the temperature of the coagulated protein is not higher than 22 deg C; there is no burn-on of the product and its yield and nutritive value are higher; volume, weight and size of the plant are reduced, and the process can be easily automated.

B-31604

Wolff, M., **Antarctic research cruise,** *Ascent,* April 1985 No.6, p.35.

Australia's participation in the second phase of the Second International BIOMASS Experiment (SIBEX 2), a ten-nation cooperative research program designed to find out more about the distribtuion and abundance of krill, is reported. The Australian study, the most comprehensive Antarctic marine research cruise ever conducted by that country, involved use of echo sounders, taking of biological samples and placement of long-term current meters. Research concentrated on age, sex, reproductive rate, swarming behavior, etc. Gut contents were also analyzed.

B-31630

Rangel Nunes, M., **Observation of birds** [Observaçãos de pássaros], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.21-22, In Portuguese. 3 refs.

This is a brief report on the ornithological program organized on board a ship cruising in the Antarctic in which 39 specimens of 7 different species of antarctic birds were sighted.

B-31633

Foggo, M.N., Meurk, C.D., **Bioassay of some Campbell Island soils,** *New Zealand journal of ecology,* 1983 Vol.6, p.121-124, 10 refs.

DLC QH540.N43

Growth of *Avena sativa* and *Agrostis tenuis* was measured on peat and mineral soils from sites on Campbell I. in the New Zealand Subantarctic. For the peat soils, growth was strongly positively correlated with both pH and Mg levels and less strongly with Ca and Na. With the inclusion of the mineral soil data, only the fit between growth and Ca levels was significant. (Auth.)

B-31664

Vladimirskaia, E.V., Polonskiĭ, V.E., Popkov, V.V., Spiridonov, V.A., **Distribution and seasonal peculiarities of plankton in reference to the hydrology of the northern Amundsen Sea during the austral summer of 1982** [Raspredelenie i sezonnye osobennosti planktona v sviazi s gidrologicheskimi usloviiami v severnoĭ chasti moria Amundsena osen'iu 1982 g], *Antarktika; doklady komissii,* 1985 No.24, p.143-157, In Russian. Refs. p.156-157.

A study is reported of hydrological conditions and vertical and horizontal distribution of plankton at 66-69 S and 110-128 W, a zone of NW-SE diversion of the Antarctic Circumpolar Current. Discussed, among others, are five different species of phytophagous copepods and the influence of the Antarctic Circumpolar Current on their population.

B-31665

Makarov, R.R., Soliankin, E.V., Shevtsov, V.V., **Environmental conditions and adaptive biology of *Euphausia superba* Dana in the Lazarev Sea** [Usloviia sredy i adaptivnye cherty biologii *Euphausia superba* Dana v more Lazareva], *Antarktika; doklady komissii,* 1985 No.24, p.158-171, In Russian. Refs. p.170-171.

Discussed are the contrasting effects of two types of waters in the Lazarev Sea—the antarctic coastal current and the Weddell drift—in the distribution of physical characteristics, in phytoplankton species composition, and in krill population. It is found that krill's spawning begins earlier in the coastal waters, than to the north in the Lazarev Sea.

B-31666

Naumov, A.G., Chekunova, V.I., **Food supply for *Euphausia superba* Dana and phytophagous mesoplankton in the waters of the Scotia Sea second frontal zone and in the region of the South Orkney Islands** [K voprosu ob obespechennosti pishcheĭ *Euphausia superba* Dana i mirnogo mezoplanktona v vodakh vtorichnoĭ frontal'noĭ zony moria Skosha v raĭone IUzhnykh Orkneĭskikh ostrovov], *Antarktika; doklady komissii,* 1985 No.24, p.172-184, In Russian. efs. p.182-184.

A study of primary productivity and the factors controlling phytoplankton growth in one of the regions with stable concentrations of krill, the second frontal zone off South Orkney Is., is reported. Krill's diet, its growth cycle, size and energy consumption at various stages of maturity are discussed and tabulated. Data show that during the spring and summer season, about 4 months, the phytoplankton grows at double the rate of the demand for it, but this supply decreases sharply, from 50 to 15%, in the fall. Data also show that in abnormally warm years mesoplankton is the prevailing species, while in abnormally cold years, it is krill.

B-31697

Stein, M., Rakusa-Suszczewski, S., **Meso-scale structure of water masses and bottom topography as the basis for krill distribution in the SE Bransfield Strait Feb.-March 1981,** *Meeresforschung,* 1984 30(2), p.73-81, With German summary. 16 refs.

The highest densities of krill biomass occurred in the region of the greatest differences in the structure of water masses, above the continental shelf slope of the Antarctic Peninsula. Bottom topography affects the direction of water movements and the hydrodynamical processes which cause the formation of swarms. (Auth.)

B-31698

Kellermann, A., Kock, K.-H., **Postlarval and juvenile notothenioids (Pisces, Perciformes) in the southern Scotia Sea and northern Weddell Sea during FIBEX 1981,** *Meeresforschung,* 1984 30(2), p.82-93, With German summary. 34 refs.

74 RMT 8 and 19 krill trawl catches were carried out during the FIBEX echo survey and a following krill patch study in January/February 1981. The sample contained postlarvae and juveniles of 20 species of the antarctic and subantarctic endemic suborder Notothenioidei. Their distribution has been analyzed in relation to hydrographical conditions and krill. For the high antarctic species, the Weddell Scotia Confluence represented the northernmost limit of distribution. The occurrence of a number of species was mainly or exclusively restricted to krill aggregations. The importance of this association is discussed. (Auth.)

B-31699

Morris, D.J., Keck, A., **Time course of the moult cycle and growth of *Euphausia superba* in the laboratory. A preliminary study,** *Meeresforschung,* 1984 30(2), p.94-100, With German summary. 16 refs.

Adolescent antarctic krill, *Euphausia superba Dana,* were maintained in aquaria for over two months. Molting studies were conducted in the first two weeks post-capture and after one month's acclimation to laboratory conditions (3 deg C). A time course has been constructed for the various stages of the molt cycle. The first post-molt stage was completed within 24 hours. The remaining post-molt stage occurred between 0.5 and 8 days post-molt. The following stages, preparation for the next molt, were found between 6 and 15 days post-molt. Krill of mean standard length of 25.5 mm exhibited a mean intermolt period of 14.3 days. The mean length increment for these animals was 2.01 mm/molt. Negative growth was noted in animals 28.7 mm standard length. Temporal aspects of the progression of stages of the molt cycle and the effects of laboratory culture on molting and growth are discussed. Growth data are compared with both published laboratory and field estimates. (Auth.)

B-31700

Marschall, H.-P., **Sinking speed, density and size of Euphausiid eggs,** *Meeresforschung,* 1983 30(1), p.1-9, With German summary. 15 refs.

Size and sinking speed of eggs of *Euphausia superba, Meganyctiphanes norvegica* and *Thysanoessa raschii* were measured under laboratory conditions. Sinking speed ranged between 42 and 67 m/day in *Thysanoessa raschii* eggs and between 61 and 104 m/day in *Meganyctiphanes norvegica* eggs. *Euphausia superba* eggs showed a higher sinking speed of 140 to 320 m/day. Egg density, calculated applying the Navier-Stokes' equation, was always higher than the sea water density of their natural environment. Investigations on the influence of salinity on the size of the eggs of *Meganyctiphanes norvegica,* spawned at different salinities in the laboratory, showed significant differences in mean diameter of the embryo. Experimental decrease in salinity caused a rapid increase in embryo diameter, probably due to water intake. (Auth.)

B-31701

Keller, R., **Contributions to the early life history of *Pleuragramma antarcticum* Boul. 1902 (Pisces, Nototheniidae) in the Weddell Sea,** *Meeresforschung,* 1983 30(1), p.10-24, With German summary. 17 refs.

Larvae of *Pleuragramma antarcticum* Boul. 1902 were collected during a survey between Dec. 1979 and Feb. 1980 in the inner Weddell Sea. Larvae were taken by means of a bongo net and a Hensen net. Developmental series of larvae of standard length, from 11.8-36.8 mm, are illustrated and described. Metamorphosis begins between 20-30 mm standard length. Developmental changes in the larvae have been studied by observations on the sequence of changes in the pigmentation pattern in body form and formation of fins. Development of the dorsal and anal fin rays starts in the posterior parts of the body. Growth rates of *P. antarcticum* postlarvae, derived from length frequency distributions over a 6 wk period, were about 0.2 mm/day. (Auth.)

B-31702

Kaczmaruk, B.Z., **Occurrence and distribution of the antarctic copepods along the ice shelves in the Weddell Sea in summer 1979-1980,** *Meeresforschung,* 1983 30(1), p.25-41, With German summary. 26 refs.

Copepods, from samples taken during a cruise of M.S. *Polarsirkel* to the inner Weddell Sea in summer 1979/1980, were identified and counted. Low abundance and diversity of copepods were recorded from the western part of the study area, in the upper 50 m. Eastwards, a steady increase of both factors was observed. Most abundant were 2 small copepods, a calanoid, *Ctenocalanus vanus,* and a cyclopoid, *Oithona* sp.; typical large antarctic copepods were scarce. Calanoid copepodids constituted a considerable part of the population. (Auth.)

B-31703

Dring, M.J., West, J.A., **Photoperiodic control of tetrasporangium formation in the red alga *Rhodochorton purpureum*,** *Planta,* 1983 159(2), p.143-150, 19 refs.

DLC QK1.P73

Six geographical isolates of *Rhodochorton purpureum* (Lightfoot) Rosenvinge (Rhodophyta, Nemalionales) formed tetrasporangia only in short days at 10 deg C. For most isolates, the critical day-length increased with latitude of origin from 9.5 h for an isolate from California to 14.5 h for one from Antarctica. Tetrasporangium production could be induced by 9-15 short-day cycles followed by a further 22-28 cycles in long days. A night-break consisting of 1 h of white light in the middle of a 16-h dark period inhibited the short-day response of isolates from low latitudes, but not those from higher latitudes. When a similar night-break was given in the middle of a 14-h dark period, however, the response of all isolates was at least partially inhibited. The mediating photoperiodic responses among algae are more varied than those among flowering plants. (Auth. mod.)

B-31704

Jacques, G., Hoepffner, N., **Sinking rates of subantarctic neritic phytoplankton** [Vitesse de sédimentation du phytoplancton néritique subantarctique], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 3,* Nov. 14, 1984 299(14), p.581-584, In French with English summary. 13 refs.

Sinking rates of phytoplankton from Kerguelen Is. (laboratory measurements on sinking columns) were measured. They are some of the lowest known for oceanic plankton from 0.1-0.5 m/day, with a high buoyancy for size fraction < 40 micron. Thus, the settling of particles towards the deep layer is not a major factor to consider in primary production models of such a phytoplankton community. This is probably not the case in real antarctic oceanic communities.

B-31712

Summers, R.W., Dunnet, G.M., **Sheld-geese and man in the Falkland Islands,** *Biological conservation,* 1984 30(4), p.319-340, Refs. p.338-340.

The history of the association between sheld-geese (upland geese *Chloephaga picta* and ruddy-headed geese *C. rubidiceps)* and man in the Falkland Is. is described from the time when they were used as food by early settlers, to the conflict with the sheep industry. A bounty scheme was instigated by sheep farmers in 1905 and claimed 74,000 geese annually between 1905 and 1912. The population of geese remains large despite this toll and recent studies of the annual cycle, movements and population dynamics give reasons for the failure of the bounty scheme to reduce numbers. Information on food intake and densities of geese on different vegetation types has indicated that the geese populations take only 1.5% of the total annual organic matter production of herbage. This represents 7% of what is eaten by all the herbivores. (Auth.)

B-31713

Le Cohu, R., Maillard, R., **Monoraphidinae diatoms in the Kerguelen Islands** [Les diatomées monoraphidées des îles Kerguelen], *Annales de limnologie,* 1983 19(3), p.143-167, In French. 33 refs.

The monoraphidinae in the Kerguelen Is. are represented by the two genera, *Achnanthes* and *Cocconeis,* producing a total of 35 taxa of which 2 are described for the first time. Most of the species and varieties were examined by L.M., S.E.M. and M.E.T.; a detailed account of their morphology is given. Vestigial raphe traces occurred in the rapheless valves of several species and varieties. In addition, the presence of pores at the ends of the axial area was observed in the rapheless valve of some other species. These pores may be considered as vestiges of terminal pores than of a former raphe or as precursors of a true raphe that has not yet evolved fully on the rapheless valve. (Auth.)

B-31714

McGrath Grossi, S., Kottmeier, S.T., Sullivan, C.W., **Sea ice microbial communities. 3. Seasonal abundance of microalgae and associated bacteria, McMurdo Sound, Antarctica,** *Microbial ecology,* 1984 10(3), p.231-242, 33 refs.

Numbers of bacteria in annual sea ice increased directly with numbers of algae during the 1981 spring ice diatom bloom in McMurdo Sound. Algae and bacteria in a control site grew at rates of 0.10 and 0.05/day, respectively, whereas in an experimentally darkened area neither increased after 6 wk. Epiphytic bacteria grew at a rate twice that of the nonattached bacteria and were significantly larger, contributing approx. 30% of the total bacterial biomass after pennate diatoms, and *Amphiprora* sp. and *Nitzschia stellata.* More than 65% of epiphytic bacteria were associated with *Amphiprora* sp. after October. *N. stellata* remained largely uncolonized throughout the study. Microalgae probably stimulate bacterial growth in sea ice, possibly by providing the bacteria with organic substrates. (Auth.)

B-31715

Palmisano, A.C., Kottmeier, S.T., Moe, R.L., Sullivan, C.W., **Sea ice microbial communities. 4. The effect of light perturbation on microalgae at the ice-seawater interface in McMurdo Sound, Antarctica,** *Marine ecology. Progress series,* Jan. 10, 1985 21(1-2), p.37-45, Refs. p.44-45.

In McMurdo Sound an *in situ* light perturbation study was conducted on 1.5 m thick annual sea ice during the 1981 austral spring ice microalgal bloom. A 100 sq m quadrat was covered with snow to a depth of 70 cm reducing under ice irradiance by 97% relative to a control quadrat with 7 cm of natural snow cover. Samples were collected from the ice-sea water interface within each quadrat by SCUBA divers. After the first 3 wk of light perturbation net ice growth was about 20 cm; there was no significant difference in chlorophyll *a* ratios in the 2 quadrats during this period. However, during the following 3 wk when net ice growth was zero, C:chl *a* ratios dropped to 38 in control while ratios in the light perturbed quadrat remained high. Photosynthetic rate in the control reached a peak of 0.35 mg/C in early December but was not detectable in the light perturbed quadrat. Facultative heterotrophy was found in natural populations of sea ice diatoms at substrate concentrations close to ambient. Low rates of heterotrophic uptake may provide sufficient C and energy for maintenance metabolism during the dark winter months. (Auth. mod.)

B-31716

Chojnacki, J., Węgleńska, T., **Periodicity of composition, abundance, and vertical distribution of summer zooplankton (1977/1978) in Ezcurra Inlet, Admiralty Bay (King George Island, South Shetland),** *Journal of plankton research,* 1984 6(6), p.997-1017, Refs. p.1015-1017.

Seasonal succession and variation in species composition, density, biomass, age distribution and frequency of zooplankton (mainly the Copepoda) were analyzed during the austral summer of 1977/1978 in Ezcurra Inlet, a part of the antarctic coastal ecosystem. Small zooplankters were found to predominate in terms of abundance and percentage contribution. The zooplankton biomass was dominated by larger organisms of the Metridiidae and Calanidae (Calanoida). The maximum abundance and maximum biomass of copepods were recorded in February. The vertical distribution of copepods in terms of their diel and seasonal (December, January, February, March) changes showed a day-time maximum to have occurred in the near-bottom layer, the nocturnal distribution being bimodal with peaks within 0-10 m and 25-50 m. The summer zooplankton community in Ezcurra Inlet is controlled by trophic and hydrological conditions prevailing in the area. (Auth. mod.)

B-31722

Moe, R.L., **Benthic marine algal flora of Antarctica with special reference to *Himantothallus, Ascoseira,* and the Ceramiaceae,** Berkeley, University of California, 1983, 270p., University microfilms order No. 84-13519, Ph.D. thesis. Refs. p.256-270. For abstract see Dissertation abstracts international, Sec.B, Dec. 1984, p.1665.

The benthic marine algal flora of Antarctica comprises about 100 species, of which 34% are endemic and only 17% range beyond the Subantarctic. Most occur in West Antarctica. Most species are perennial and grow in the sublittoral, but summer annuals flourish in areas protected from ice. The widespread, kelp-like brown alga, *Himantothallus grandifolius,* is shown to belong to Desmarestiales. Another brown alga, *Ascoseira mirabilis,* produces biflagellate swarmers that germinate without fusion into plants resembling the parent. In the red algal family Ceramiaceae, the new genus and species *Antarcticothamnion polysporum* is placed in the tribe Antarcticothamnieae. Newly described reproductive and vegetative characters of *Antithamnion antarcticum* justify transfer to the resurrected genus *Pterothamnion Nageli.* *Georgiella confluens* is specifically and generically distinct from *Plumariopsis eatonii,* with which it has been confused, and from the newly described species *P. peninsularis.* Six new species of Kallymeniaceae are informally described. Reproductive structure supports placement of *Nereoginkgo adiantifolia* in Kallymeniaceae. *Kallymenia antarctica* Hariot is related to Sarcodia (Sarcodiaceae). New information is provided for ten species of Delesseriaceae. (Auth. mod.)

B-31723

Casalta, L.L., Olle, M., Blachère, A., Ceccaldi, H.J., **Sterols and fluoride of the antarctic krill, *Euphausia superba* Dana (Crustacea)** [Stérols et fluor du krill antarctique, *Euphausia superba* Dana (Crustacea)], *Téthys,* 1984 11(2), p.127-132, In French with English summary. Refs. p.131-132.

Sterols of the antarctic krill *Euphausia superba,* collected during the MD.25 FIBEX cruise, were identified by capillary gas chromatography and mass spectrometry. Two main sterols were quantitatively determined: cholesterol, 75-80% according to the sampling sites, and desmosterol, 15-19%. 22-Dehydrocholesterol, 24 methylene cholesterol, delta 7 stigmasterol and brassicasterol were present in small concentrations: 0.5-2.1%. Two other unknown sterols were present in proportions lower than 1%. The fluoride was assayed by specific ionic electrode. Maximum content was demonstrated in the exoskeleton: 1370-1390 ppm/dry weight and there was considerable content in the flesh: 145-155 ppm/dry weight. (Auth.)

B-31724

Manniot, C., ***Ascidia retinens* n. sp. (Tunicata) and remarks on the Ascidians of Crozet Islands (SW Indian Ocean)** [*Ascidia retinens* n. sp. (Tunicata) et remarques sur les Ascidies de l'archipel Crozet (SW de l'océan Indien)], *Téthys,* 1984 11(2), p.197-199, In French with English summary. 4 refs.

During the cruise MD30/BIOMASS of M/S *Marion Dufresne,* a new species, *Ascidia retinens,* was collected between 145 and 535 m, related to other species of the continental slope. *Styela squamosa* is recorded for the first time from the archipelago, from between 290 and 1,225 m. The ascidian fauna of Crozet is very poor (21 species) compared to Kerguelen (67 species). (Auth.)

B-31727

Murai, T., Hirasawa, Y., Akiyama, T., Nose, T., **Effects of previous dietary history on the mortality and changes in body composition of chum salmon fry during starvation in seawater,** *National Research Institute of Aquaculture, Tamaki-cho, Japan. Bulletin,* 1983 No.4, p.79-86, In Japanese with English summary. 8 refs.

In a 4-week feeding study with swim-up fry of chum salmon, *(Oncorhynchus keta),* using diets containing 5% earthworm or krill meal with or without substitution of pollack liver oil by beef tallow (5%) and commercially available trout feeds with different protein and fat levels, fish achieved 340-520% weight gains, but only dietary protein and fat levels showed significant effects on the body composition. Fish transferred directly into seawater (33.5%) and starved after the feeding trial showed various rates (1.5-18.6%) of mortality in the first week depending on diet and a significant correlation between body protein content and survival during starvation was noted. Although the body size at the beginning of starvation had a significant correlation with survival during the first week, correlation between condition factor or fat content and survival were extremely poor throughout the whole period. (Auth. mod.)

B-31728

Gallikowski, C., **Investigation of antarctic soil microorganisms and their interrelationships** [Untersuchung antarktischer Bodenmikroorganismen und ihrer Wechselbeziehungen], Kiel, Christian-Albrechts-Universität, 1985, 75p., Thesis. In German. Refs. p.72-75.

In this study soil samples from the dry valleys were examined and 86 microorganisms were isolated. Soil samples were taken from sandstone, granite, and dolerites. Various kinds of fungi were found, including five strains of penicillin, and are described. Temperature ranges are given in which the microorganisms throve and degrees of acidity/alkalinity were measured. The research showed that even in poor soil of an inhospitable antarctic coast a considerable diversity of bacteria and fungi may be found.

B-31734

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Working Party on Fish Ecology. Report of the fourth meeting. Dammarieles-Lys, France, Aug. 25-29, 1984,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* [1985] No.42, 52p.

The meeting covered the following items for discussion: Revision of the Nototheniidae; a manuscript on the orders of antarctic fish; a review of the biology of antarctic fish; a draft review of the fish of South Georgia; papers from the second Workshop on the ageing of antarctic fishes; a review of the biology and status of antarctic fish stocks, the development of antarctic fisheries and the influence of fishing on the stock. Several recommendations for revisions in the above areas are suggested, and a follow-up of earlier recommendations is included. Results of SIBEX 1 are reported, through the summarized activities of the participating nations; included are plans for SIBEX 2 and an evaluation of SIBEX fish data. Other items discussed are: a handbook for identification of fish remains in the stomachs of predators; an atlas of antarctic fish otoliths; and future activities. Several annexes cover a report of work on fish prey of antarctic animals, mortality estimation in antarctic fish, details of the atlas of antarctic fish otoliths, and the taxonomy and biology of the fishes of the southern ocean, respectively.

B-31735

Smith, W.O., Nelson, D.M., **Phytoplankton bloom produced by a receding ice edge in the Ross Sea: spatial coherence with the density field,** *Science,* Jan. 11, 1985 227(4683), p.163-166, Numerous refs.

Measurements of chlorophyll, particulate carbon, and biogenic silica concentrations near a receding ice edge off the coast of Victoria Land indicated the presence of a dense phytoplankton bloom. The bloom extended 250 kilometers from the ice edge and was restricted to waters where the melting of ice had resulted in reduced salinity. The region involved was one of enhanced vertical stability, which may have favored phytoplankton growth, accumulation, or both. Epontic algae released from melting ice may have served as an inoculum for the bloom. Ratios of organic carbon to chlorophyll and biogenic silica to carbon were unusually high, resulting in high biogenic silica concentrations despite only moderately high chlorophyll levels. (Auth.)

B-31744

Gray, J.S., ed, Christiansen, M.E., ed, **Marine biology of polar regions and effects of stress on marine organisms,** European Marine Biology Symposium, 18th Oslo, Aug. 1983. Proceedings, Chichester, U.K., John Wiley & Sons, 1985, 639p., For selected papers see 39-3154 through 39-3156, or B-31745 through B-31753.

DLC QH95.56.E87 1983

Various creatures whose lives are tightly bound to sea ice and cold waters are examined in these papers. Physiological, morphological, and behavioral characteristics and adaptations present insights as to how the creatures survive and thrive in such harsh and stressful environments.

B-31745

Hempel, G., **On the biology of polar seas, particularly the southern ocean,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.3-33, Refs. p.29-33.

DLC QH95.56.E87 1983

A few salient points are developed on the differences in past and present environments of Arctic and Antarctic resulting in striking contrasts between their respective ecosystems. For the Antarctic system emphasis is given to the latitudinal zonation brought about by the circular currents and by the seasonality of the pack-ice. A summary on environmental factors determining life in the epipelagic and benthic habitats of the southern ocean and a comparison of oceanographic characteristics of the Arctic and Antarctic Region are given.

B-31746

Schnack, S.B., Smetacek, V., Bodungen, B., von, **Utilization of phytoplankton by copepods in antarctic waters during spring,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.65-81, 32 refs.

DLC QH95.56.E87 1983

Copepod biomass, species composition and feeding have been compared with the standing stock and production of phytoplankton in the upper 100 m from 3 stations near the Antarctic Peninsula. The 3 stations, representative of the 3 ecological zones encountered here in November/December 1980, differed considerably in biomass and composition of phytoplankton and zooplankton. In the open waters of the Drake Passage, phytoplankton biomass was low and that of the copepods high. Copepod ingestion was approximately 50% of daily primary production. In the region of the ice edge adjoining Joinville Island, phytoplankton biomass and production were high and biomass of zooplankton low. Daily ingestion was only 0.6% of primary production. In the regions of high phytoplankton biomass, sinking of cells accounted for greater loss from the surface zone than grazing by copepods, which is similar to findings reported from spring blooms in shelf areas of the Northern Hemisphere. (Auth. mod.)

B-31747

Garrison, D.L., Buck, K.R., **Sea-ice algal communities in the Weddell Sea: species composition in ice and plankton assemblages,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.103-122, 40 refs.

DLC QH95.56.E87 1983

In the late austral summer of 1980, samples were collected from the water column, from young sea ice, and from older ice floes in the Weddell Sea. Algae were identified in these environments using light and electron microscopy. Cluster analysis was used to identify the relationship among species and to compare assemblages among samples. Most species were found in both water and ice but none were exclusively associated with ice. Planktonic diatoms were numerically important in both water and ice. The average similarity among assemblages in the water column was 54%, and some spatial heterogeneity was found among samples from open water, the ice edge, and under heavy pack ice cover. Assemblages in young sea ice were essentially identical to those from adjacent water samples. The study shows that the same species occupy both ice and water environments in the Weddell Sea. Such similarity can be explained by a cycle where algal cells are regularly trapped and survive in ice, and are released back into the water column for an extended period of seasonal melting. (Auth.)

B-31748

Razouls, S., **Observations on the ecophysiology of a planktonic crustacean, *Drepanopus pectinatus* (Copepoda, Calanoida, Pseudocalanidae), from southern islands,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.123-139, 25 refs.

DLC QH95.56.E87 1983

The copepod *Drepanopus pectinatus* in neritic waters of Kerguelen Archipelago represents an important proportion of the mesozooplanktonic biomass with abundances up to 7,000 ind/cu m. Observations made during two austral summer months revealed that all growth stages were present. Experiments on food consumption by copepods and filtration rate were conducted for *in situ* measurements of chlorophyll. Assimilation rate was estimated by chlorophyll content of the fecal pellets. Food intake was significantly correlated to phytoplankton abundance but without reaching a plateau at higher concentrations. O2 consumption measurements are compared with other copepods from antarctic, sub-antarctic or temperate waters. Metabolic requirements were consistent with those of herbivorous temperate species of copepods. Females bear an unpaired ovisac, which can liberate 20 to 40 nauplii every five days, in summer. (Auth. mod.)

B-31749

Bergeron, J.P.R., Alayse-Danet, A.M., Razouls, C., **Metabolic adaptations of antarctic mesozooplanktonic systems to the phytoplankton standing crop in late austral summer,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.157-166, 24 refs.

DLC QH95.56.E87 1983

In the Antarctic zone of the Indian Ocean activities of two digestive enzymes, amylase and trypsin, and of aspartate transcarbamylase (ATC) were measured, and lipid class composition, especially levels of wax esters and triglycerides, was investigated. Amylase specific activities appear to be fairly well correlated to the variations of chlorophyll concentrations and to intrinsic contents of wax esters. Aspartate transcarbamylase activities show inverse relationships with these variables. The results suggest an adaptation pattern which is quite consistent with the special metabolic requirements of a mesozooplanktonic system preparing to face a long overwintering period. The nutritional acitivity appears to be closely adapted to the weak phytoplankton standing crop, the anabolic activity is so directed that the energy from catabolism of ingested carbohydrates is used for energy storage by biosynthesis of wax esters, the biochemical compounds specifically devoted to long term energetic reserves, at the expense of the protein production potential. (Auth.)

B-31750

Picken, G.B., **Benthic research in Antarctica: past, present and future,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.167-184, Refs. p.176-184.

DLC QH95.56.E87 1983

This paper describes the major features of the flora and fauna of the Antarctic benthos, reviews the numerous contributions to our understanding of the taxonomy, ecology and physiology of biota published in the last decade, and outlines important subjects for future benthic research in Antarctica. (Auth.)

B-31751

Clarke, A., **Reproductive biology of the polar hippolytid shrimp *Chorismus antarcticus* at South Georgia,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.237-245, 29 refs.

DLC QH95.56.E87 1983

Chorismus antarcticus is a small benthic hippolytid shrimp common in shallow water around South Georgia. It is a protandrous hermaphrodite, and females become sexually mature in their third post-metamorphic summer. Vitellogenesis takes about 6 months, and the eggs are spawned in January. These eggs are large, containing about 125 micrograms lipid when spawned, and they are brooded by the female for 9-10 months. Embryonic development is unusual in that egg lipid content increases to about 230 micrograms per egg during the first 4 months of brooding, and then declines to about 100 micrograms when the schizopod larva hatches. It is suggested that the various features of the life-history of *Chorismus*, and those of many other Antarctic marine invertebrates, are not the result of rate-limitation by the low temperatures, but are the expression of a delicate tuning of the reproductive cycle to the pattern of primary productivity in the antarctic marine environment. (Auth.)

B-31752

Duchêne, J.C., **Comparative study of respiration in a north temperate and sub-antarctic population of *Thelepus sestosus* (Annelida: Polychaeta),** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.247-257, 27 refs.

DLC QH95.56.E87 1983

Oxygen consumption values of *Thelepus sestosus* were between 0.05-0.5 ml O2/g/h for individuals from Kerguelen and between 0.5-3 ml O2/g/h for individuals from Roscoff. Q-10 value for the Kerguelen population was 2.91 for 850 mg dry weight individuals compared with 1.55 for Roscoff for an 18 mg dry weight individual. For a 20 mg individual Q-10 values were 1.05 and 1.45, respectively. These results apparently agree with assumption that the cold adapted population at Kerguelen has a higher metabolic rate. Yet growth rates in individuals from Kerguelen were three times as fast as individuals from Roscoff. Thus respiration can be related to growth rate rather than cold adaptation *per se*. (Auth.)

B-31753

Battaglia, B., **Genetic variability and geographic differentiation in some benthic invertebrates from the Kerguelen region,** Marine biology of polar regions and effects of stress on marine organisms, edited by J.S. Gray and M.E. Christiansen, Chichester, U.K., John Wiley & Sons, 1985, p.299-311, 15 refs.

DLC QH95.56.E87 1983

Practically no information is available on the genetic structure of marine animal populations inhabiting the Kerguelen region. The present paper is a preliminary contribution towards filling this gap. Genetic variation was analysed by means of electrophoretic techniques in two species of isopods from Kerguelen; five populations of a copepod, one from Crozet and four from Kerguelen; and two species of bivalves from Kerguelen. The results indicate a wide range of heterozygosity values, not dissimilar from those found in similar organisms at lower latitudes. The affinity indexes worked out for the copepod populations show a high genetic distance between the populations from Crozet and Kerguelen, suggesting that they are distinct species. The existence of a complete reproductive barrier between the populations of the two islands supports this view. Cross-breeding experiments and estimations of gene-frequencies lead to the conclusion that the Crozet-Kerguelen region is a rather active site of genetic differentiation. (Auth. mod.)

B-31754

Claridge, G.C., **Soil investigation in Antarctica, 1969-70,** *New Zealand soil news,* June 1970 18(2), p.101-104.

DLC S599.75.A1N47

Ten soil samples, as well as a number of lichen samples, collected for biological analysis in the vicinity of the Scott Glacier area, are discussed. Of the ten samples, two appeared to have no soil life, neither lichens, bacteria nor protozoa. These were samples of gravel, sand and silt. Small populations of bacteria, less than 100/g, were present in two soils without lichens and in one coarse textured sample of gravel and sand with lichens. Much higher bacterial populations, over 1,000/g, occurred in two samples of wet glacial silt and gravel without lichens and in three samples of gravel, sand, and silt or fine silt with lichens. Protozoa appeared to be represented only by small amoebae which were present in three of the samples with large bacterial populations. One of the samples, the one with the largest bacterial population, also had a rotifer. The bacteria appeared to be able to grow both at 4 and 24 deg.

B-31755

Barré, H., **Remarkable adaptation of penguins to the cold** [Une adaptation remarquable au froid: les manchots], *Recherche,* Feb. 1981 12(119), p.224-226, In French. 9 refs.

DLC Q2.A782

Experiments conducted on penguins to find out why they can resist low temperatures longer than man are described. The physiology of heat production and retention in penguin and man is disucssed.

B-31756

O'Sullivan, D.B., Johnstone, G.W., Kerry, K.R., Imber, M.J., **Mass stranding of squid *Martialia hyadesi* Rochebrunne & Mabille (Teuthoidea: Ommastrepidae) at Macquarie Island,** *Royal Society of Tasmania. Papers and Proceedings,* Aug. 1983 Vol.117, p.161-163, 8 refs.

DLC Q93.T2

A large number of squid, subsequently identified as *Martialia hyadesi* (Ommastrephidae) was stranded on beaches at the northern end of Macquarie I. on 5 March 1971. The squid were immature, or at least pre-breeding, and had been feeding recently. It is suggested that a sudden change in wind direction, coupled with a rising tide, caused the stranding. This is the first reported stranding of this species, which has not previously been recorded in the Pacific region. (Auth.)

See also:
A-29486 A-30060 A-30341 A-30529 A-30546 A-30599
A-30806 A-31024 A-31242 A-31675 C-31258 E-29127
E-29172 E-29573 E-29576 E-29577 E-29637 E-29713 E-29714
E-29793 E-29848 E-30230 E-30232 E-30235 E-30238 E-30245
E-30246 E-30247 E-30251 E-30255 E-30256 E-30386 E-30395
E-30396 E-30411 E-30448 E-30519 E-30522 E-30523 E-30526
E-30528 E-30564 E-30692 E-30864 E-30871 E-30903 E-30980
E-31150 E-31188 E-31218 E-31225 E-31305 E-31309 E-31330
E-31384 E-31388 E-31394 E-31408 E-31409 E-31410 E-31411
E-31412 E-31428 E-31450 E-31488 E-31569 E-31677 F-29745
F-30419 F-30763 G-29406 G-31563 H-29322 I-29105 I-29235
I-30700 I-30976 I-31397 I-31649 J-29089 J-29090 J-29092
J-29191 J-29192 J-29203 J-29337 J-29798 J-30176 J-30192
J-30267 J-30470 J-30515 J-30520 J-30541 J-30666 J-31240
J-31637 J-31642 J-31643 K-30882 M-29178 M-29819 M-30048
M-30053 M-30444 M-30547 M-31026 M-31360 M-31676

C. CARTOGRAPHY

C-29436
Pathak, M.C., **Position fixing in Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.41-45.

Antarctica with large desolate areas, snow and ice cover, few landmarks, hostile weather and bad radio propagation conditions poses problems for position fixing. The Expedition used a portable land sea satellite position fixing system and least square and 3 D techniques to determine the following positions: Automatic Weather Station, *Dakshin Gangotri,* Base Camp (Hut), and Base Camp. The positions obtained were accurate within a few meters. (Auth.)

C-29601
Brooks, R.L., Williams, R.S., Ferrigno, J.G., Krabill, W.B., **Amery Ice Shelf topography from satellite radar altimetry,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.441-445, 8 refs.
DLC QE350.A57 1983

During its operational lifetime, July to October 1978, the Seasat satellite made 43 radar altimeter traverses across the Amery Ice Shelf, East Antarctica. Data were collected from the nominal height of 800 km above the Earth's surface at a sub-satellite traverse spacing of 670 m. The southernmost extent of the satellite areal coverage was 72.06 S latitude which included the terminus of the Lambert Glacier. An altimeter waveform retracking algorithm was used to determine a total of 6,016 well-distributed surface elevations with a precision 47 cm. Surface contours at 5 m intervals, with supplemental contours at 1 m intervals, have been drawn for the ice shelf. These satellite altimeter-derived contours have been superimposed onto a Landsat mosaic of the ice shelf, resulting in the first merger of data from the two satellite remote sensing systems. (Auth.)

C-29602
Ferrigno, J.G., Williams, R.S., Jr., Kent, T.M., **Evaluation of Landsat 3 RBV images for earth science studies in Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.446-449, 11 refs.
DLC QE350.A57 1983

Landsat 3 return beam vidicon (RBV) imagery is a potentially valuable tool for Earth Science studies especially where location, terrain and weather conditions make field logistics difficult, hazardous and costly. The 30 m resolution of this camera is a major improvement over the 79 m resolution of Landsats 1 and 2 RBV and the Landsat multispectral scanner. Landsat 3, which has been in orbit since March 5, 1978 has the potential of imaging 75% of the Antarctic continent. During its four years of operation, the Landsat 3 RBV camera has imaged 1477 scenes of various parts of Antarctica. It is often difficult, however, to determine which of these images are useful because cloud cover and image quality are hard to evaluate. On images of Antarctica, cloud cover and snow cover are easily confused. In addition, the Landsat 3 RBV sensor is handicapped by engineering problems which result in image washout (overexposure) in areas of high reflectance, such as snow or ice covered terrain or deserts. Because of the potential value of Landsat 3 RBV images of Antarctica for many types of earth science studies and the preparation of image base maps for fieldwork, the film archive was examined to provide a complete and accurate evaluation of these images. The location and an assessment of the quality of all available Landsat 3 RBV images of Antarctica is shown. (Auth.)

C-29702
Swithinbank, C., **Towards an inventory of the great ice sheets,** *Geografiska annaler. Series A Physical geography,* 1983 65A(3-4), p.289-294, 31 refs.

In view of the global effects of climatic change there is an urgent need to detect even a small mass imbalance in the polar ice sheets. The relative merits of possible methods of achieving this are compared. No current or planned experiments can provide a reliable answer. However, satellite altimetry could measure even small changes within a few years. (Auth.)

C-30151
Gregory, M.R., Kirk, R.M., Mabin, M.C.G., **Shore types of Victoria Land, Ross Dependency, Antarctica,** *New Zealand antarctic record,* 1984 5(3), p.23-40, Refs. p.38-40.

The extent and distribution of five coastal types along the Victoria Land coast of the Ross Sea is presented in a series of maps which are arranged in latitudinal sequence from north (Cape Adare) to south (McMurdo Sound). The total length of shoreline measured for each map is indicated and there is also a bar graph displaying the proportions of each coastal type for that map. An attempt has been made on both bar graphs and maps to demonstrate possible summer maximum and minimum variation of sea ice cover that could protect the shore from possible oil spills.

C-30408
Williams, R.S., Jr., Ferrigno, J.G., Meunier, T.K., **Satellite glaciology project,** *Antarctic journal of the United States,* 1983 18(5), p.119-121, 12 refs.

This article contains descriptions of five research projects and a discussion of other antarctic-related activities by the staff of the Satellite Glaciology Project. The research efforts include: 1) Satellite Image Atlas of Glaciers, 2) Index to and Table of Optimum Landsat Images of Antarctica, 3) Blue-ice Meteorites, and Satellite Imagery in Antarctica, 4) Satellite Radar Altimetry of the Amery Ice Shelf, East Antarctica, and 5) Coastal Maps of Antarctica.

C-30566
Hirakawa, K., **Geomorphological map of Langhovde [and] Explanatory text of geomorphological map of Langhovde, Antarctica,** *Tokyo. National Institute of Polar Reserach. Special map series,* Mar. 1984 No.1, 1 sheet + 63p., In English and Japanese. Refs. p.46-49.

The map covers the area between 39 deg 53 min 40 sec E and 39 deg 34 min E from 69 deg 10 min 20 sec S to 69 deg 18 min 20 sec S (the approximate center point of the Langhovde Hills). It measures 93 X 64 cm and is constructed to a scale of 1:25,000. It is based on a topographic map of the area published by the Geographical Survey Institute in 1968 and a geological map published by the National Institute of polar Research in 1976. Aerial photographs, taken at various times between 1962 and 1982, augment the base maps. Five major legend categories, each with a number of details, describe the map: morphology and morphometry; geomorphological processes and their traces; areas of geomorphological processes; lithology and geological structure; and inland water. Inset maps show the general location, areas of geomorphological processes, and slope classification, the latter being a small version of the full scale slope overlay of the map. Details of the mapping system used to construct the map and the resulting map features are explained in the accompanying text.

Photographs, two in spectacular stereoscopic views, show typical map features. Legend entries are given in both Japanese and English.

C-30622

Sör Rondane Reconnaissance Party, **Report on the reconnaissance survey of the Sör Rondane Mountains, 1984,** *Antarctic record,* Aug. 1984 No.82, p.46-70, In Japanese with English summary. 3 refs.

The reconnaissance party consisted of a four-man snowmobile party and a six-man snow vehicle party. The latter party left the Icebreaker *Shirase* in Breid Bay by helicopter on February 7th. Two SM40S-type snow vehicles were knocked down on board, transported by helicopter and set up about 11 km inland from the head of Glacier Bay (provisionally named "LO" point). The snowmobile party was transported 55 km inland from the coast ("30 miles point") and started towards the Romnoesfjellet. They arrived at the "Seal" rock on February 11th. The snow vehicle party arrived there on February 13th, after building the prefabricated hut at the "30 miles point" and setting snow stakes along the route from the "LO" point to the Romnoesfjellet via the "30 miles point". During 9 days survey on the northern flank of the Sör Rondane Mountains, they set two geodetic control stations using the JMR satellite position system, and carried out geological investigation and collection of rock specimens for the paleomagnetic study. In addition, they conducted the search for the base camp site for the coming season. Both parties were picked up by helicopters at the "30 miles point" on February 23rd after depositing the snow vehicles and other materials. (Auth.)

C-30646

Grushinskiĭ, N.P., Sazhina, N.B., Nikitina, I.S., Torochkova, G.I., **Gravity anomaly map of Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.249-255, TT 79-52012, For Russian original see 10C-21702. 25 refs.

A gravimetric map of Antarctica (scale 1:5,000,000) compiled with data collected over the past 20 years is described. The map was drawn up in two versions, depending on how altitude of test points was determined—by free atmosphere pressure or by Bouguer data. The materials used are briefly reviewed. (Auth. mod.)

C-30760

Dietrich, R., **Possibilities for satellite geodesy through Doppler observations in polar regions** [Potentielle Möglichkeiten beim Einsatz des Doppler-Verfahrens der Satellitengeodäsie in Polargebieten], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.49-51, In German with English and Russian summaries. 5 refs.

The possibilities of satellite Doppler observations in polar regions for navigational purposes, for the solution of global geodetic problems, for regional surveys and for glaciological research are discussed. (Auth.)

C-30764

Richter, W., **On the hydrographic chart of the Schirmacher Oasis (Queen Maud Land, East Antarctica)** [Zur hydrographischen Karte der Schirmacher Oase (Königin-Maud-Land, Ostantarktika)], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.74-84, In German with English and Russian summaries. 31 refs.

The Schirmacher Oasis is one of the polar deserts on the border of the Antarctic Continent. During the 24th Soviet Antarctic Expedition (1979-80) it was possible to map the region hydrographically. The given paper describes the general geographical situation, the aim of mapping and the details of the map. Great importance was attached to the diversity of the phenomena of the lakes in relation to origin and form. This additional map of drainage basins illustrates the contrast between plenty and shortage of water within small areas. (Auth.)

C-30794

Brecher, H.H., **Landsat 3 RBV imagery as scale control for a topographic map of Seymour Island, Antarctica, from nonmetric aerial photographs,** *Surveying and mapping,* Sep. 1984 44(3), p.253-258, 3 refs.

A topographic map of Seymour Island was compiled at a scale of 1:20,000 with a 10-m contour interval from a single recoverable ground point, a Doppler satellite position, on the island. The procedure, including photography, aerial triangulation block adjustment, control and plotting, is described in detail, and a reduced version (1:150,000) of the map is presented.

C-30803

Schneider, M.M., Elstner, C., Auster, V., Schäfer, U., **Geophysical investigations carried out by the GDR in Antarctica,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.15-19, With German and Russian summaries.

Geodetic-gravimetric measurements are desirable in Antarctica but very difficult to obtain because of the harsh antarctic conditions. One of the prime needed activities is the establishment of a precise geodetic-gravimetric reference system similar to those outside the polar regions. This has been one of the goals of the GDR geophysical program. Progress toward that goal is discussed in geomagnetic measurements in Queen Maud Land.

C-30807

Meier, S., Dietrich, R., **Geodetic-glaciological studies in the East Antarctic 1962-1978,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.31-35, With German and Russian summaries.

These studies began in 1962 when GDR geodesists took part in the 7th SAE. Brief histories of the measurements are given from investigations around Mirnyy, traverses to Vostok, precisely locating the bases, and studies of Hays Glacier. Photographs are included showing field conditions and instruments.

C-30875

Schmidt-Falkenberg, H., **German contributions to the cartography of the Antarctic using photogrammetry and remote sensing** [Deutsche Beiträge zur Kartographie der Antarktis mittels Photogrammetrie und Fernkundung], *Zeitschrift für Vermessungswesen,* Apr. 1984 109(4), p.141-154, In German with English summary. 23 refs. An English translation of this article is planned for publication in Nachrichten aus dem Kartenund Vermessungswesen, Reihe II, Institut für Angewandte Geodäsie, Frankfurt a.M.

The author reviews the exploration and cartographic activities by Germany before 1945. Because of the great importance of the Antarctic Expedition 1938/39 and the first use of aerial survey cameras by a German expedition, special emphasis is placed on that expedition. Activities after 1945 are reported, in particular the contributions of the FRG to the topographic-chorographic cartography of the Antarctic and the establishment of a "Digital Name File, Antarctica" for antarctic place names in the German language. Lastly, a report is given on activities planned by the FRG in antarctic photogrammetry and remote sensing. (Auth. mod.)

C-30876

Köhler, M., Ritter, B., **Geodetic deformation measurements on the Ekström, Filchner, and Ronne Ice Shelves** [Geodätische Verformungsmessungen auf dem Ekström- und Filchner-Ronne-Schelfeis], *Zeitschrift für Vermessungswesen,* Apr. 1984 109(4), p.154-161, In German with English summary. 12 refs.

On the basis of geodetic measurements carried out in order to determine special networks on ice shelves during the austral summers 1979/80, 1980/81 and 1981/82, evaluations and accuracies are interpreted. Strain parameters of the surface near the two German Antarctic Stations on Ekström and Filchner-Ronne Ice Shelf are deduced and discussed. (Auth.)

C-30968

Southard, R.B., **Mapping activities in Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.299.

The National Mapping Division of the U.S. Geological Survey once again fielded a team of cartographers in Antarctica for the 1982-83 austral summer. Two members of the team obtained control for mapping and the other two relieved two division personnel who had wintered at Amundsen-Scott Station. Sixty-nine new stations were set using conventional triangulation and electronic distance-measuring equipment and four previously established stations were occupied with Navy navigation satellite tracking equipment. The wintering cartographers had continued work in support of two major programs —satellite tracking and seismology.

C-31135

Hoppe, P., Tessensohn, F., **Landsat images of Antarctica** [Landsat-Bilder der Antarktis], *Geologische Rundschau,* May 1981 70(2), p.637-647, In German with English, French and Russian summaries. 6 refs.

DLC QE1.G4917

In the Antarctic summer of 1979/80 the German Antarctic North Victoria Land Expedition carried out geoscientific investigations in the northern part of Victoria Land. Landsat satellite images from a section of the northeastern corner of Victoria Land, west of the Ross Sea, are described. These photos represent the first digital image processing for this area. Their value can be discerned already, especially in terms of knowledge on the glaciology, geomorphology, and geology of this region. (Auth.)

C-31157

Karsten, A., **Geodetic survey in the area of the Filchner Ice Shelf Project 1983/84 and on the Ekström Ice Shelf** [Geodätische Messungen im Rahmen des Filchner-Schelfeis-Projektes 1983/84 und auf dem Ekström-Schelfeis], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.57-63, In German.

Some of the research activities of three working parties are outlined. Strain rates and velocity fields were determined for the shelf ice in their work areas. Logistical requirements for the three parties were established and set up at the various field stations. Ice dynamics and deformation were measured and geographic positions of the field stations were determined. Geophysical and meteorological observations were made at eastern Filchner Ice Shelf locations; firn and snow stratigraphy at others; and *Polarstern* radar surveyed the ice edge at the base of the Antarctic Peninsula. On Ekström Ice Shelf, in addition to motion and strain field measurements, work was done in engineering glaciology, meteorology, and isostasy.

C-31168

Sievers, J., Walter, H., **Photogrammetry 1983/84 in western New Schwabenland** [Photogrammetrie 1983/84 im westlichen Neuschwabenland], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.156-164, In German.

Various aspects of difficulties to anticipate in order to accomplish the program are outlined. Preparations necessary to reduce the problems brought on by the character of Antarctica and training with the equipment to be used are shown. Two major conditions in Antarctica are discussed and their effects on the program are examined. These involve mostly light reflection from snow cover, both wide, uninterrupted expanses and large and small patches in mountainous regions. Choices in types of film, shutter and light settings, and filters to ease these conditions are discussed.

C-31254

Shiraishi, K., **Report on the reconnaissance survey of the Sör Rondane Mountains,** *Polar news,* July 1984 No.39, p.14-20, In Japanese.

The Japanese Antarctic Research Expedition carried out a reconnaissance survey of the Sör Rondane Mountains in February 1984. The reconnaissance party consisted of a four-man snowmobile party and a six-man snow vehicle party. The latter party left the icebreaker *Shirase* in Breid Bay by helicopter on February 7th. Two SM40S-type snow vehicles were disassembled on board, transported by helicopters and reassembled at about 11 km inland from the head of Glacier Bay (provisionally named "LO" point). The snowmobile party was transported 55 km inland from the coast ("30 miles point") and started towards the Romnoesfjellet. They arrived at "Seal" rock on February 11th. The snow vehicle party arrived there on February 13th, after building the prefabricated hut at the "30 miles point" and setting snow stakes along the route from the "LO" point to the Romnoesfjellet via the "30 miles point." During the 9 day survey on the northern flank of the Sör Rondane Mountains, they set up two geodetic control stations using the JMR satellite positioning system, and carried out geological investigations and collection of rock specimens for the paleomagnetic study. (Auth.)

C-31258

Omori, M., **Kite-flying in the Antarctic Ocean: photographic observation of patchy distribution of antarctic krill,** *Polar news,* July 1984 No.39, p.52-54, In Japanese.

Photographic observation of patchy distribution of the Antarctic krill *(Euphausia superba)* was attempted using "Rokkaku-dako" (hexagonal kite) and parafoil kites in the Antarctic Ocean during the cruise of *Umitaka Maru* (BIOMASS/SIBEX) in the austral summer 1983-84. A camera (Canon AE-1) with a motor-driven winder was attached to the kite rope and was successfully operated by means of radio control. The author indicates several advantages of this handy and inexpensive photographic method, and also discusses possible application of this method for other research work.

C-31378

Banhidy, J., **Casey site plan, Issue No.4,** Canberra, Aug. 1984, 1 sheet.

The drawing of the station layout at a scale of about 2.5cm/50 m shows locations of buildings and identifies them by function. Routes of reticulated services both above and below ground are also shown as are E-W and N-S construction lines and bench marks. Prevailing wind is easterly at casey; most structures are oriented parallel to it.

C-31379

Banhidy, J., **Mawson site plan, Issue No.3,** Canberra, Aug. 1984, 1 sheet.

The drawing of the station layout at a scale of about 2.5cm/50m shows locations of buildings and identifies them by function. Routes of reticulated services both above and below ground are also shown as are E-W and N-S construction lines and benchmarks. Prevailing wind is southeasterly at Mawson; most structures are oriented parallel with it.

C-31380

Banhidy, J., Kutle, T., **Davis site plan, Issue No.4,** Canberra, Aug. 1984, 1 sheet.

The drawing of the station layout at a scale of about 2.5cm/50m shows locations of buildings and identifies them by function. Routes of reticulated services both above and below ground are also shown as are E-W and N-S construction lines and benchmarks. Prevailing wind at Davis is northeasterly; most structures are oriented parallel with it.

C-31454

Thomas, I.L., Nicholas, J.V., **Special colour enhancement for three channels having similar radiances,** *International journal of remote sensing,* Sept.-Oct. 1984 5(5), p.753-760, 8 refs.

A special enhancement algorithm is derived to color separate ground-cover classes whose recorded wavelength distributions are similar but have significantly differing intensities. The special enhancement function is derived from considering the spectrum locus of a CIE 1931 (x,y) chromaticity diagram. By analogy with the relationship between the chromaticity co-ordinates and the channel radiance levels a function is derived that stretches the radiances to maximize the color differences between such ground-cover classes. This Sinusoidal Squeeze algorithm is applied to enhance the color differentiation of Antarctic ice types as recorded by LANDSAT. A comparison is made between this special enhancement and the conventional color composite results for antarctic ice pack. (Auth. mod.)

C-31609

Köhler, M., **Glaciological/geodetic work on the Filchner and Ekström Ice Shelves since 1979/80** [Glazialgoedätische Arbeiten auf dem Filchner- und Ekström Schelfeis seit 1979/80], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.18-25, In German with English summary. 3 refs.

Geodetic measurements were carried out in order to derive the velocity and strain behavior of Filchner Ice Shelf. The measurements are described and first results are reported. (Auth.)

C-31616

Sievers, J., Walter, H., **Photogrammetry in western New Schwabenland 1983/84** [Photogrammetrie im westlichen Neuschwabenland 1983/84], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.68-71, In German with English summary.

During the German Antarctic Expedition 1983/84 the polar research aircraft DO 228-100, called *Polar 2,* could be used for photogrammetric purposes to take aerial vertical photography in parts of western New Schwabenland for producing large scale topographical maps of that region. Operational areas were Georg von Neumayer Station and the ice front of the Ekström Ice Shelf as well as the nunatak region of the Ahlmann Ridge and the Borg Massif. (Auth.)

See also:
A-30188 B-29500 E-29292 E-29560 E-30388 E-30930 E-31577 F-29310 F-29651 F-29697 F-30486 I-30286 J-30467 J-30499 L-31050 L-31598

D. EXPEDITIONS

D-29162

Kohnen, H., **Antarctic expedition on *Polarbjörn* and work at Georg von Neumayer Station and in New Schwabenland** [Die Antarktis-Expedition mit der *Polarbjörn* und die Arbeiten bei der Georg-von-Neumayer-Station und in Neuschwabenland], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.7-12, In German.

An account is given of the voyage from Bremerhaven to Atka Bay via Rio de Janiero, Rio Grande do Sol, and Grytviken. The crew of the vessel, the wintering and summer parties, and helicopter crew are identified, scientific programs in atmospheric physics, glaciological engineering, and meteorology are outlined, and individual responsibilities are given. Various other programs at Georg von Neumayer Station and in the field are also shown. The loss of a large helicopter on Jan. 5, 1983 is reported and highlights of the programs in biology and geology are noted. The ship returned to Bremerhaven on Mar. 13, 1983 following 33 days at sea.

D-29211

Huber, B.A., Rennie, S.E., **Reports of the US-USSR Weddell Polynya Expedition October-November 1981. Volume 1, Introduction,** *Columbia University. Lamont-Doherty Geological Observatory. Report,* 1983 L-DGO 83-3, 20 leaves, 9 refs.

This volume serves to provide an overview of the entire expedition and as an index to subsequent reports. It includes a table of titles and authors of the seven volumes in the series and a statement of expedition planning, logistics, and cruise objectives. The programs are described in physical oceanography, chemistry, biology, sea ice, meterology, and underwater sound velocity. A roster of participating scientists is given, the source of funding is shown, and an hourly log of events is provided to guide the user in correlating information from the various reports.

D-29291

Ross, M.J., **Ross in the Antarctic: the voyages of James Clark Ross in Her Majesty's Ships *Erebus* and *Terror* 1839-1843,** Whitby, Yorkshire, England, Caedmon, 1982, 276p., Numerous refs.

Details are given of the background of Arctic experience gained by Ross in his early years and of the general instructions given him by the Admiralty as to where they expected him to go and what he was expected to accomplish in the Antarctic, especially terrestrial magnetism observations for navigational purposes. In the four years in which Ross, with *HMS Erebus* and *HMS Terror,* sailed the mid- and high latitudes of the Southern Hemisphere, he made three separate antarctic voyages. The first, from Nov. 1840-Apr. 1841, took him to the Ross Sea, the Balleny Islands, and Wilkes Land. The second, Nov. 1841-Apr. 1842, was spent mostly embedded in the pack ice between 90 and 120W; it was on this second voyage that he reached 78 deg 9 min 30 sec south, a most southerly record that remained unbroken for 90 years; it was also on this voyage that the whole expedition nearly came undone when the ships collided in an icefield accompanied by bergs larger than either ship. The third voyage, Dec. 1842-Mar. 1843 was made to the northern and eastern reaches of the Antarctic Peninsula. Details are given of the three voyages and the refits at the Kerguelen and Falkland Islands.

D-29409

Mae, S., **Activities of the summer party of the 23rd Japanese Antarctic Research Expedition in 1981-1982,** *Antarctic record,* Dec. 1983 No.80, p.47-57, In Japanese with English summary.

The relief ship, icebreaker *Fuji,* left Tokyo on November 25, 1981, carrying about 500 tons of cargo. After calling at Fremantle she arrived at the edge of pack ice on December 31, 1981. The transportation of cargo and personnel to and from Showa Station was carried out between January 4 and February 11, 1982. After the accomplishment of field operations in the Showa Station area, *Fuji* visited Molodezhnaya Station and Amundsen Bay. Then she returned to Tokyo on April 20, 1982 via Port Louis and Singapore. Observation of ionosphere and studies in physical, chemical and biological oceanography were performed on board. At Showa Station, studies of moss ecology and oceanographical observations in the ice-covered sea were carried out. Geological and geodetic surveys were made in the ice-free areas of the Soya Coast. At Molodezhnaya Station, USSR-Japan cooperative research on upper atmosphere physics was carried out and geological and biological samples were collected. In the Amundsen Bay area, geological, geomorphological, gravimetric and biological surveys were made with the cooperation of the 22nd Wintering Party. (Auth. mod.)

D-29469

Fiennes, R., **To the ends of the earth: the Transglobe Expedition—the first pole-to-pole circumnavigation of the globe,** New York, Arbor House, 1983, 547p.

DLC G440.T74F54 1983

This detailed account of the 7 years needed for the birth of the concept of the Transglobe Expedition, the training for it, the necessary organizing and administrative effort, and the 3 years for the expedition itself should remove any lingering notions that there is anything but struggle, hard work, and courage involved in a trek of this nature. In spite of setbacks, British governmental opposition, reluctant sponsors, a skeptical scientific community, unwilling agencies of other governments, and no money, the Expedition persisted and in the end overcame the obstacles and dangers to accomplish the polar transits. The route was generally along the 0-180 meridian from Greenwich across the Sahara, down the west coast of Africa to Capetown, to Antarctica at SANAE Base, the South Pole, Scott Base, New Zealand, Alaska, up the Yukon, through the Northwest Passage to the North Pole, and south to Greenwich. Maps are included of this route with sectional maps showing individual segments. In appendices are shown scientific programs in oceanography, geophysics, birds and mammals, primary productivity, meteorology, zoology, magnetosphere, high frequency radio propagation, glaciology, and altimetry. Lists are included of all involved with the Expedition.

D-29487

Fiennes, R., **Polar aspects of the Transglobe Expedition,** *olar record,* Jan. 1984 22(136), p.51-56, 3 refs.

The Transglobe Expedition circumnavigated the world between September 1979 and 1982, keeping as close as possible to the Greenwich meridian. This involved journeys in both polar regions. During the expedition's southern phase (1979-81) two overwintering bases were established in Antarctica and a party of three crossed the icecap on snowmobiles, via the South Pole. During the northern phase (1981-83) two men traversed the Northwest Passage by boat and on foot, sledging across Ellesmere Island to the settlement of

Alert, where a party of three overwintered. Two then set out over the pack ice, crossing the North Pole and drifting with the floating ice toward Svalbard, to be picked up by the expedition ship. (Auth.)

D-30195

Fletcher, H., **Antarctic days with Mawson. A personal account of the British, Australian and New Zealand Antarctic Research Expedition of 1929-31,** Sidney, Angus & Robertson, 1984, 313p.

The author participated as assistant zoologist in two voyages of the British, Australian and New Zealand Antarctic Research Expedition, under the leadership of Sir Douglas Mawson, from October 1929 to April 1930, and from November 1930 to March 1931. Extracts from his diaries, as well as from notes of other participants, describe the everyday experiences, activities, feelings and personality traits of the expedition's thirty-seven members on board the expedition's vessel *Discovery* and during the performance of their duties in Antarctica. The text is accompanied by numerous photographs. The history of the discovery of Antarctica and its surrounding islands, and early attempts to reach the South Pole, are also reviewed.

D-30491

Ellis, A.R., ed, Lashly, W., **Under Scott's command: Lashly's Antarctic diaries,** New York, Taplinger, 1969, 160p.

DLC G850 1901.D642

The private diaries of Chief Petty Officer William Lashley, member of Captain Robert Falcon Scott's two expeditions to Antarctica, serve as a basis for this narrative of events which culminated in the tragic loss of Scott's polar party in 1912.

D-30578

Lewis, D., George, M., **Icebound in Antarctica,** *National geographic magazine,* Nov. 1984 166(5), p.635-663.

An account is given of the winterover experiences of the crew on a private expedition to Antarctica. It was an attempt to show that scientific research could be conducted inexpensively by icebounding a small boat through the winter and using it as a base camp. The group made sledging exploring forays over the ice into regions within 75-100 miles of the vessel. They made biological observations of seals and penguins, tagging the former, counting the latter, and discovered new rookeries. They were twice rescued by icebreakers; were ill-served by their mechanic/engineer; one expedition member rebelled and had to be sent home. They also discovered the unwritten but universally accepted antarctic principle that those who are able, willingly aid victims of adversity.

D-30621

Ohyama, Y., **Activities of the summer party of the 24th Japanese Antarctic Research expedition in 1982-1983,** *Antarctic record,* Aug. 1984 No.82, p.30-45, In Japanese with English summary.

The icebreaker *Fuji* left Tokyo on November 25, 1982. After calling at Fremantle, she arrived at the ice edge off Showa Station on December 31. All the cargo for the expedition was transported to the station by January 22, 1983 and the wintering members of the JARE-24 took over the duties at the station February 1. After accomplishment of summer operations in the Showa Station area, *Fuji* visited Breid Bay about 600 km west of the station. Then she returned to Tokyo on April 20, 1983 via Port Louis and Singapore. Oceanographic and ionospheric observations were carried out throughout the voyage. Several field parties for geological, biological and geodetic survey were sent to ice-free areas around Showa Station. Biological and oceanographical observations under sea ice were carried out at Showa Station. A party was dispatched to Mizuho Station to take it over, and to resupply the materials for wintering. A new power station building at Showa Station was constructed during the relief period. In the Breid Bay area, the condition of sea ice was observed and some glaciological surveys were carried out in the snow field 30 miles from the ice shelf edge. Also aerial reconnaissance was carried out to find the access route to the Sör Rondane Mountains. (Auth.)

D-30810

Tripphahn, B., **25 years of antarctic expeditions and their preparation,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.45-49, With German and Russian summaries.

The detailed planning that is a prerequisite for a successful expedition is examined and briefly described. The logistics of deciding on how much of what materials and services is needed, acquiring, loading, and delivering the materials to the proper destinations requires difficult and meticulous planning several years ahead. This kind of preparation continued over the years in putting together the GDR antarctic expeditions.

D-30880

Börde, H., Johansen, K.H., **Adventure in the Antarctic** [Eventyret Antarktis], Oslo, Gyldendal, 1978, 112p., In Norwegian. Refs. p.110-112.

DLC G860.B63

The events are described of the 1977 Norwegian Antarctic Expedition via the Falkland Islands, South Orkneys, Dronning Maud Land, and Bouvetöya. General background information is given on the goals of the Expedition, science programs pursued, and some of the gear and equipment used both aboard the *Polarsirkel* and at the land stations. An outline is given of 18th, 19th, and 20th century discovery and exploration voyages, whaling and sealing activities, and Norway's territorial claims competition with Germany. The development of the present status is followed from the IGY through the Antarctic Treaty period to the current concerns over the substance of antarctic natural resources and problems of exploitation.

D-30993

Norwegian Polar Research Institute's 1984-85 Antarctic Expedition, *Arctic news record,* Sep. 1984 3(2), p.39.

A brief outline is given of the Expedition which will concentrate on programs in geology and glaciology. Parties of geologists will go ashore in Queen Maud Land while the glaciologists will operate from aboard the Norwegian Coast Guard Icebreaker *Andenes* studying sea ice. They will all go together for additional studies at Bouvet I. Capabilities and structural characteristics of *Andenes* are noted.

D-31154

Kohnen, H., ed, **Expedition Antarktis II with RV *Polarstern* 1983/84; Report of leg 4 of the voyage: Punta Arenas to Capetown** [Die Expedition Antarktis-II mit FS *Polarstern* 1983/84; Bericht vom Fahrtabschnitt 4 Punta Arenas-Kapstadt (Ant-II/4)], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.1-185, In German and English.

The work contains expedition reports covering the period from Jan 6-Mar 9, 1984 and includes overall phases of resupply of Georg von Neumayer Station and the summer research program there; the start of the Filchner Ice Shelf Project; and a marine research program along the antarctic coast from 8W to 60W which included projects in biology, geology, geophysics, meteorology, and oceanography. General overviews of the expedition outline the programs, goals, and research locations; give personnel lists, participating institutions, and schedules; show expedition routes; and locate oceanographic stations occupied. For selected individual reports see 39-1600 through 39-

1615 or B-31161, 31162; C-31157, 31168; E-31163, 31164, 31170; F-31155, 31156, 31158, 31159; G-31166, 31167; I-31169; and J-31160, 31165.

D-31477

Ernest Shackleton's incredible adventure [La increíble aventura de Ernest Shackleton], *Antártida,* May 1982 No.12, p.8-15, In Spanish. Part 2. For Part 1 see 13D-27719.

This article on Shackleton's expedition recounts the final part of the story—waiting for help on Elephant Island, the tribulations of the rescue party sent on its way to find South Georgia and help, the crossing of the island, the rescue operation, and the death of Shackleton on his next expedition to Antarctica a few years later.

See also:
A-30127 A-30128 A-30751 A-30752 A-31061 E-29163
E-30561 E-31396 F-30991 G-30510 H-30584

E. GEOLOGICAL SCIENCES

E-28962

Anderson, J.B., **Geologic observations on the Antarctic continental margin: applications to exploration in high latitude seas,** *Offshore Technology Conference. Proceedings,* 1979 11th, p.643-646, 10 refs.

The following factors influence Antarctic glacial marine sedimentation: (1) erosion of the continent is mainly by the mechanical action of glacier ice; (2) the coast is almost completely covered by grounded or floating ice; (3) the continental shelves experience frequent and rapid physiographic changes related to glacial erosion and isostatic movement; (4) the terrestrial-marine boundary shifts continuously with eustatic and isostatic fluctuations. The East Antarctic Ice Sheet is relatively stable because it is frozen at the base, in contrast to the unstable West Antarctic Ice Sheet, which is wet-based and sliding. (Auth.)

E-28963

Kurtz, D.D., Anderson, J.B., Balshaw, K,M., Cole, M.L., **Glacial marine sedimentation: relationship to the distribution of sediment geotechnical properties on high latitude continental margins,** *Offshore Technology Conference. Proceedings,* 1979 11th, p.683-688, 11 refs.

Engineers working in high latitude offshore regions must deal with the geotechnical properties of sediments deposited in the glacial-marine environment. Descriptions of sediment textures and facies distributions from the Antarctic continental margin and the Puget Lowlands are used as examples to illustrate the potential geotechnical complexities. This complexity is due to the wide variety of sedimentary, glacial, and post-glacial processes which influence the formation and modification of glacial-marine sediments. The maximum limit of grounded ice marks the boundary between two very different sedimentologic environments. Seaward of this line sediments are deposited from floating ice and by normal marine processes. Sediment character is relatively consistent over wide areas, though vertical variations may be present. Shoreward of this maximum buoyancy line sediments are deposited by grounded ice, floating ice, and interglacial processes. This combination of sedimentary agents, in addition to probable reworking through several glacial stages, creates an extremely complex suite of deposits. (Auth. mod.)

E-28972

Zarikhin, I.P., **New data on the contours of the bottom continental margin of the northwestern Antarctic Peninsula and South Shetland Islands** [Novye dannye o rel'efe dna podvodnoĭ okrainy severo-zapadnoĭ chasti Antarkticheskogo poluostrova i u IUzhnykh Shetlandskikh ostrovov], *Antarktika; doklady komissii,* 1982 No.21, p.63-69, In Russian. 23 refs.

Data collected by the VNIRO expedition shows characteristics of the bottom continental margin of the northwestern Antarctic Peninsula and South Shetland Islands. The northern shelf of the Antarctic Peninsula, crossed by grooves from glacier activity, shows a lacerated outline, while the northern shelf of South Shetland Islands is deeper and smoother, showing no lacerations. The slopes of Bransfield Strait lack symmetry, being sharp and fringed on the north, and smooth and terraced on the south. The bottom of Bransfield Strait is, on the western side, leveled by a series of underwater volcanic layers. On the east, the Strait shows a narrow, sharply inclined groove. The northern slope of South Shetland Islands is uneven. The western side of the Shackleton Ice Shelf slope is sharper and more fringed than the eastern side. It is suggested that the lacerations of the submerged portions are not only due to tectonic factors, but also to glacier erosion and accumulation.

E-28973

Kotenev, B.N., Verechkin, B.N., Zolotarev, B.P., **Geomorphology of the underwater Discovery mountains** [Geomorfologiia podvodnykh gor Diskoveri], *Antarktika; doklady komissii,* 1982 No.21, p.70-77, In Russian. 13 refs.

The underwater chain of Discovery mountains consists of sharp and tall volcanic cones. The mountains are guyots, and after the formation of sub-horizontal tops they dropped to 400-500 m. The slanting planes surrounding the mountain tops give them the appearance of helmets. The morphological resemblance points to concurrent development. Transform fault data from the Tristan da Cunha region permits to link the genesis of Discovery mountains to the period of strong diapiric activity, from 40 to 20-25 m.y.a. After the formation of the mountains, the tops undervent a short period of stiring activity which shaped them into flat tops. Due to prolonged accumulation, the mountains are covered with sedimentary rocks. A short description of the sandstone and basalts is included.

E-28974

Bardin, V.I., Shmideberg, N.A., **Peculiarities of the chemical composition of natural waters in Amery lakes, Mac. Robertson Land** [Osobennosti khimicheskogo sostava prirodnykh vod oazisa Ėĭmeri (Zemlia Mak-Robertsona)], *Antarktika; doklady komissii,* 1982 No.21, p.78-94, In Russian. 11 refs.

Results of hydrochemical analyses of natural waters and snow in the mountain region of Mac. Robertson Land are reported. Tabulated data, obtained at different locations and at different depths, shows two basic types of water and information regarding the process of the chemical transformation from atmospheric precipitation to lake water. The salt accumulation investigated in various lakes is found to have occurred from 20 to 90 thousand years ago.

E-28983

Hassinger, J.M., Mayewski, P.A., **Morphology and dynamics of the rock glaciers in southern Victoria Land, Antarctica,** *Arctic and alpine research,* Aug. 1983 15(3), p.351-368, 69 refs.

A baseline study of rock glaciers was performed in order to determine their usefulness as proxy tools in studies of climatic change. The relative activity of rock glaciers and their vertical velocity profiles are inferred from termini morphology. Thirty-eight percent of the rock glaciers are stagnant, 41% show velocity decreasing rapidly with depth, and velocity decreases gradually with depth in the remaining 21%. A structural-compositional model for 11 rock glaciers, constructed from geophysical data, consists of an ice-free layer from 0.3 to 3 m thick that is underlain by either interstitially frozen debris or ice. Horizontal velocities of 1 to 3 cm/yr, surface lowerings ranging up to 1 cm/yr, and infinitesimal strain rates of .0001/yr were measured for the lower geophysically defined layer of one rock glacier. Analyses of rock glacier dynamics and internal structure are considered useful in studies of climatic change since the response to thermal and moisture change is as good or better than that of true glaciers. (Auth. mod.)

E-28989

Papanastassiou, D.A., Wasserburg, G.J., Brownlee, D.E., **Chemical and isotopic study of extraterrestrial particles from the ocean floor,** *Earth and planetary science letters,* Sep. 1983 64(3), p.341-355, 46 refs.

We report chemical, mineralogic and Rb-Sr data on deep-sea spherules and on particles from an antarctic ocean core in which an excess Ir content has been identified. 87Sr/86Sr compositions in the deep-sea spherules are determined and are in the range observed for the majority of chondritic meteorites. 84Sr/88Sr ratios are normal to within 1%. Extreme depletion of Rb relative to the chondritic abundance is found in the deep-sea spherules. These data support the inference based on chemical composition and mineralogy that the deep-sea spherules are produced by the ablation or heating of meteoroids in the Earth's atmosphere with substantial loss of Rb by volatilization. Most terrestrial sources for the deep-sea spherules can be excluded, based on the chemical composition and on the Sr isotopic composition. (Auth. mod.)

E-28995

Suárez D., M., **Geological evolution of the southern Andes, the Scotia Arc and the Antarctic Peninsula: a synthesis** [Evolución geológica de los Andes del sur, Arco de Scotia y Península Antártica: una síntesis], *Estudios geológicos,* 1979 Vol.35, p.473-485, In Spanish with English summary. Refs. p.482-485.

The Scotia Arc and the margins of South America and the Antarctic Peninsula, on the southeastern border of the Pacific Ocean, have been affected, at least since the Late Paleozoic, by tectonic processes related to convergence and divergence of plates and transform faulting. An Upper Paleozoic-Lower Mesozoic accretionary belt appears intermittently along the Pacific margins of these regions, suggesting the presence of a coeval magmatic belt associated with it. During the Upper Mesozoic, the southern tip of South America and the Antarctic Peninsula were joined together by an island-arc-back-arc system and basins with characteristics similar to those of the ocean floor. Important readjustments of lithospheric plates occurred in the Scotia Sea region during the Lower Tertiary, resulting in the separation of the Antarctic Peninsula from South America. Interaction between various plates is still occurring in the Scotia Sea region. (Auth. mod.)

E-29008

Marvin, U.B., **Discovery and initial characterization of Allan Hills 81005: the first lunar meteorite,** *Geophysical research letters,* Sept. 1983 10(9), p.775-778, 9 refs.

Antarctic meteorite ALHA 81005, discovered in the Allan Hills region of Victoria Land, is a polymict anorthositic breccia which differs from other meteorites in mineralogical and chemical composition but is strikingly similar to lunar highlands soil breccias. The petrologic character and several independent lines of evidence identify ALHA 81005 as a meteorite from the moon. Two small clasts of probable mare basalt occur among the highlands lithologies in thin section 81005,22. This lunar specimen, which shows relatively minor shock effects has generated new ideas on the types of planetary samples to be found on the Earth, and has added fresh excitement to the antarctic meteorite program. (Auth.)

E-29009

Warren, P.H., Taylor, G.J., Keil, K., **Regolith breccia Allan Hills A81005: evidence of lunar origin, and petrography of pristine and nonpristine clasts,** *Geophysical research letters,* Sept. 1983 10(9), p.779-782, 22 refs.

MnO/FeO ratios in pyroxene, texture (abundant brown, swirly glass, in general typical of lunar regolith breccias), and overall composition all indicate that Allan Hills A81005 is of lunar origin. It is presumably from a heretofore unsampled region of the Moon. It differs in detail from other regolith samples, e.g., it has exceptionally low contents of Na and KREEP. A pristine clast contains exceptionally coarse augite, compared to similar Apollo samples. ALHA 81005 is not perceptibly more shocked than typical Apollo regolith breccias. Therefore, its discovery on Earth lends further credence to suggestions that SNC achondrites were derived by impact ejection from Mars. (Auth.)

E-29010

Treiman, A.H., Drake, M.J., **Origin of lunar meteorite ALHA 81005: clues from the presence of terrae clasts and a very low-titanium mare basalt clast,** *Geophysical research letters,* Sept. 1983 10(9), p.783-786, 13 refs.

Petrographic data and pyroxene compositions indicate that meteorite ALHA 81005 is a breccia from the terrae of the Earth's Moon. Thin section ALHA 81005,0 includes ferroan anorthositic clasts, a lone clast of Mg-suite plutonic composition, fragments which are intermediate in composition between ferroan anorthosite and Mg-suite plutonics, and clast of very low-titanium mare basalt. Fragments of norite and harzburgite have mineral compositions like ferroan anorthosite, and a clast of ferroan anorthosite has pyroxenes with lower molar Mg/(Mg+Fe) than in known pristine rocks. A single basaltic clast is of mare origin, based on the molar Mg/(Mg+Fe) ratio and Cr content of its pyroxenes. The composition of its plagioclase and the molar Ti/(Ti+Cr) ratios of its pyroxenes indicate that the clast is a fragment of very low-titanium (VLT) mare basalt. If this basalt is significantly younger than the last basin-forming impact event its presence probably constrains the source crater for ALHA 81005 to be within a hundred kilometers of a VLT mare basalt flow. (Auth. mod.)

E-29011

Simon, S.B., Papike, J.J., Shearer, C.K., **Petrology of ALHA 81005, the first lunar meteorite,** *Geophysical research letters,* Sept. 1983 10(9), p.787-790, 11 refs.

Petrography and mineral compositions show that ALHA 81005 is a lunar highland regolith breccia and is the first known lunar meteorite. Lithic clasts are abundant and most are members of the anorthosite-norite-troctolite highland suite. Plagioclase compositions in lithic clasts and single grains are calcic. Pyroxene copositions, Al-Ti and MnO-FeO relationships support a lunar highland origin. A non-KREEPy source region is indicated, and the unexplored far side of the moon cannot be ruled out as a potential source. (Auth.)

E-29012

Ryder, G., Ostertag, R., **ALHA 81005: Moon, Mars, petrography, and Giordano Bruno,** *Geophysical research letters,* Sept. 1983 10(9), p.791-794, 14 refs.

Meteorite ALHA 81005, a glassy regolith breccia, is beyond any reasonable doubt of lunar origin, according to its petrographic, chemical, and isotopic characteristics. The sample was shocked at most to 15 GPa during ejection and supports the possibility of some meteorites being of Martian origin. Most lithic fragments are feldspathic granulitic impactites, cataclastic anorthosites, and impact melts, all typical lunar lithologies. Mineral fragments are derived from plutonic troctolitic and noritic rocks, varied mare basalt-like extrusive rocks, and the identified lithic fragment types. Neither petrographically nor chemically are there significant components in ALHA 81005 which were previously unknown. A mare basalt component restricts the origin of the sample: with remotely-sensed data, which eliminates most frontside, as well as farside groundtrack regions, it makes the probability of ejection from Giordano Bruno, near the Moon's NE limb, far greater than from any other lunar crater. (Auth.)

E-29013

Kurat, G., Brandstätter, F., **Meteorite ALHA 81005: petrology of a new lunar highland sample,** *Geophysical research letters,* Sept. 1983 10(9), p.795-798, 18 refs.

Meteorite ALHA 81005 is a shock-compacted lunar highland regolith breccia. Besides glasses (fragments, spherules, matrix glass), chondrules (of ANT composition), and mineral fragments, this new lunar sample contains principally three lithologies: 1) A pristine ferroan anorthosite suite consisting of anorthosites, norites, and one plagioclase peridotite. 2) A high-Mg granulitic breccia suite representing variable mixtures of troctolitic and noritic precursor rocks. 3) A melt-rock suite consisting of feldspathic basalts and metabasalts of a composition intermediate between (1) and (2). Most glass compositions and the chondrule compositions also project into this group. All lithologies and their derivatives are characteristically poor in alkalis. Neither a KREEP nor a mare basalt composition could be identified with certainty. ALHA 81005 apparently comes from a highland area far from any mare basalt and KREEP source. (Auth.)

E-29014

Mayeda, T.K., Clayton, R.N., Molini-Velsko, C.A., **Oxygen and silicon isotopes in ALHA 81005,** *Geophysical research letters,* Sept. 1983 10(9), p.799-800, 10 refs.

The antarctic meteorite ALHA 81005 has oxygen and silicon isotopic compositions identical with lunar highland rocks. The oxygen is distinctly unlike that in calcium-rich achondrites. The isotopic data are entirely consistent with a lunar origin for the meteorite. (Auth.)

E-29015

Bogard, D.D., Johnson, P., **Trapped noble gases indicate lunar origin for antarctic meteorite,** *Geophysical research letters,* Sept. 1983 10(9), p.801-803, 15 refs.

The isotopic abundances of the noble gases are reported for antarctic meteorite ALHA 81005. It contains solar wind-implanted gases whose absolute and relative concentrations are quite similar to lunar regolith samples but not to other meteorites. ALHA 81005 also contains a large excess Ar-40 component which is identical to the component in lunar fines implanted from the lunar atmosphere. Large concentrations of cosmogenic Ne-40/Kr-82 and Xe-126 in ALHA 81005 indicate a total cosmic ray exposure age of 200 million years. The noble gas data alone are strong evidence for a lunar origin of this meteorite. (Auth.)

E-29016

Tuniz, C., **Recent cosmic ray exposure history of ALHA 81005,** *Geophysical research letters,* Sept. 1983 10(9), p.804-806, 21 refs.

Measurements of the Be-10 and Al-26 contents of ALHA 81005 constrain the length and conditions of its exposure to cosmic rays. Calculations based on one-step irradiation models imply that the time spent by this object in space is shorter than that spent by most 'asteroidal' meteorites. On the other hand the results are readily consistent with a lunar origin for ALHA 81005. (Auth.)

E-29017

Morris, R.V., **Ferromagnetic resonance and magnetic properties of ALHA 81005,** *Geophysical research letters,* Sept. 1983 10(9), p.807-808, 17 refs.

Seven chips of primarily matrix material from the antarctic meteorite ALHA 81005 were analyzed by ferromagnetic resonance (FMR) and magnetic hysteresis techniques. The FMR spectra of two chips have a resonance at G=2.1 that resembles the G=2.1 resonance that is characteristic of lunar soils. Thus the FMR spectra are consistent with the lunar regolith being a progenitor for the matrix material. The total concentration of metallic iron is on the order of 0.11 equivalent wt.percent which is within the observed range of Apollo 16 rocks and soils. (Auth. mod.)

E-29018

Sutton, S.R., Crozaz, G., **Thermoluminescence and nuclear particle tracks in ALHA 81005: evidence for a brief transit time,** *Geophysical research letters,* Sept. 1983 10(9), p.809-812, 17 refs.

Thermoluminescence and nuclear particle track measurements have been made on the antarctic meteorite ALHA 81005. No nuclear particle tracks were found in Lithic fragments indicating that the clast material never resided at the very surface of the parent body. The unusually low natural thermoluminescence of this material is interpreted as being due to a combination of anomalous fading and thermal decay. The thermal decay could be due to very long terrestrial age or heating either during atmospheric entry, in a near-sun orbit or during a parent body impact event. Impact heating is considered the more likely of these possibilities for this meteorite. If the impact heating interpretation is correct the thermoluminescence data constrains the space exposure time of the object to be less than 2500 years. Such a brief earth transit time is consistent with a lunar origin for this meteorite. (Auth.)

E-29019

Pieters, C.M., Hawke, B.R., Gaffey, M., McFadden, L.A., **Possible lunar source areas of meteorite ALHA 81005: geochemical remote sensing information,** *Geophysical research letters,* Sept. 1983 10(9), p.813-816, 18 refs.

Antarctic meteorite ALHA 81005 is a regolith breccia apparently sent to earth by an impact event in the lunar highlands. Laboratory studies of this sample provide information that is used to understand the source region of the Moon using remote sensing data. The meteorite's low thorium content is inconsistent with thorium values measured for the central lunar nearside from orbit with Apollo gamma-ray spectrometers. Similarly, the mineral assemblages inferred from near infrared spectra of small impact craters on the lunar nearside do not exhibit the significant component of olivine and Fe-bearing feldspar that is observed in the meteorite spectra. The existing remote sensing data suggest that the most probable source region for ALHA 81005 is the nearside limb or the lunar farside and that the composition of ALHA 81005 represents a surface unit that has not previously been extensively sampled. (Auth.)

E-29020

Palme, H., Spettel, B., Weckwerth, G., Wänke, H., **Antarctic meteorite ALHA 81005, a piece from the ancient lunar crust,** *Geophysical research letters,* Sept. 1983 10(9), p.817-820, 24 refs.

A 128 mg sample of the antarctic meteorite ALHA 81005 was analysed for major, and trace elements by instrumental neutron activation techniques. The meteorite, or at least its major components, may be older than 4 billion years and represent a piece of the ancient lunar crust, before the formation of the large basins on the front-side of the moon. The evidence is derived from the low absolute content of incompatible elements and their slightly different fractionation pattern from KREEP, the dominant source for these elements on the front-side. The basically chondritic pattern of siderophile elements (Ni, Co, Ir, Au) is clearly distinguished from younger, basin related, meteoritic components. (Auth.)

E-29021

Verkouteren, R.M., Dennison, J.E., Lipschutz, M.E., **Siderophile, lithophile and mobile trace elements in the lunar meteorite Allan Hills 81005,** *Geophysical research letters,* Sept. 1983 10(9), p.821-824, 28 refs.

Contents of siderophilic As, Au, Co, Ga and Sb, volatile/mobile Ag, Bi, Cd, In, Se, Te, Tl and Zn and lithophilic Cs, Rb and U determined by radiochemical neutron activation analysis in ALHA 81005 are similar to those of lunar highlands samples returned by Apollo missions, indicating this meteorite's lunar origin. Five elements (Co, Ga and lithophiles) reflect lunar crustal processes while the remaining 11 siderophile and mobile elements (including the most mobile ones) indicate 1.4% micrometeorite (Cl equivalent) admixture or enrichment by thermal redistribution on the moon. Thus, in contrast to L chondrites where severe shock caused trace element loss, impact-launching of ALHA 81005 to Earth was free of substantial shock loading. In this light, a Martian origin for severely shocked SNC meteorites is plausible. (Auth.)

E-29022

Laul, J.C., **ALHA 81005 meteorite: chemical evidence for lunar highland origin,** *Geophysical research letters,* Sept. 1983 10(9), p.825-828, 30 refs.

Based on the well-established characteristic lunar and meteoritic ratios of various chemical components ALHA 81005 meteorite is undoubtedly of lunar highland origin. The ALHA 81005 meteorite is an anorthositic gabbro (72% Pl) and matches closely in chemical composition to Apollo 15 15418 and Luna 16 21013 highland rocks. The rock is a non-KREEPY and VLT type. The siderophiles Au, Ni and Ir content is high (1.5% Cl equivalent) and similar to other lunar highland breccias. The clast has a different ancient meteorite component than the bulk and matrix. The meteorite has a young terrestrial age implying a recent lunar cratering event. Therefore, during major lunar basin formation in early eons, the earth must have received a significant amount of lunar material which is now mixed in the crust. The finding of a lunar meteorite lends credibility to the suggestion that SNC achondrites may come from Mars. (Auth.)

E-29023

Korotev, R.L., Lindstrom, M.M., Lindstrom, D.J., Haskin, L.A., **Antarctic meteorite ALHA 81005—not just another lunar anorthositic norite,** *Geophysical research letters,* Sept. 1983 10(9), p.829-832, 19 refs.

Seven subsamples of meteorite ALHA 81005, a regolith breccia from the lunar highlands, have been analyzed by INAA for 32 elements. Four of them were also studied petrographically. In bulk composition the rock corresponds to anorthositic norite with a very small component of KREEP and is very similar to estimates of average lunar highlands surface. Compositions of the white clasts and the dark matrix are similar, but the clasts are more magnesium and 30-50% as rich in KREEP-related elements. The white clasts have fine-grained granulitic textures and are generally similar to Apollo 16 and 17 granulitic anorthositic norites, but are more magnesian and only 20% as rich in KREEP-related elements. Some granulitic clasts are dominated by a magnesian anorthositic norite component not represented among the 'pristine' Apollo samples. (Auth.)

E-29024

Kallemeyn, G.W., **Compositional implications regarding the lunar origin of the ALHA 81005 meteorite,** *Geophysical research letters,* Sept. 1983 10(9), p.833-836, 24 refs.

Geochemically, ALHA 81005 has all the attributes expected of a regolith sample from the lunar highlands. Most important is its Fe/Mn ratio (77), within uncertainty the same as the mean lunar ratio. There are significant differences, however, in comparison to previously sampled lunar regoliths. The closest precedents are the Apollo-16 and Luna-20 regoliths, particularly the latter, but ALHA 81005 has lower contents of Na, Ti, and incompatible elements. Feldspathic granulitic breccias such as 72559, which texturally resemble the most abundant type of clast in ALHA 81005, are also similar compositionally. From its low KREEP and Na contents it is inferred that ALHA 81005 originated well away from the K, Th, and U-rich region near the center of nearside, at least as far away as the eastern limb. (Auth.)

E-29025

Boynton, W.V., Hill, D.H., **Composition of bulk samples and a possible pristine clast from Allan Hills A81005,** *Geophysical research letters,* Sept. 1983 10(9), p.837-840, 12 refs.

Abundances of thirty-five elements were determined in two bulk samples and a white clast in the Allan Hills A81005 meteorite. High siderophile element content indicates that the sample is a regolith breccia. An Fe/Mn ratio of 77 in this meteorite eliminates parent bodies of known differentiated meteorites as the source of ALHA 81005. The incompatible elements are very similar to those found in most lunar highlands rocks, and provide very strong evidence that the sample is lunar in origin. The clast sample has the trace element pattern of a lunar anorthosite and is very low in KREEP and siderophile elements. It may be a fragment of a pristine lunar rock. (Auth.)

E-29032

Mutter, J.C., Cande, S.C., **Early opening between Broken Ridge and Kerguelen Plateau,** *Earth and planetary science letters,* Nov. 1983 65(2), p.369-376, 28 refs.

Reconstructions to total closure of the Australia-Antarctic continents causes an unacceptable overlap of Broken Ridge and Kerguelen Plateau. This has been partially resolved in the past by supposing that the northern part of Kerguelen, that is principally involved in the overlap, is younger than the remainder. We have revised the early reconstructions using a newly proposed breakup chronology of Australia and Antarctica which suggests that opening began at least 90 m.y. B.P. at an initially slow rate. This eliminates the overlap problem without invoking major age differences within the Kerguelen Plateau. It is also suggested that the northeastern flank of Kerguelen Plateau may be underlain by the "missing" westward continuation of the Diamantina Zone. It may have been isolated on the Antarctic plate by a ridge crest jump at about anomaly 24 time that also formed the Ob Trench. (Auth.)

E-29033

Keil, K., **Meteorites from Moon, Mars,** *Geotimes,* June 1983 28(6), p.25-27.

Review of preliminary studies by 18 groups of investigators of the Allan Hills meteorite, found in Antarctica in 1981, shows it to be of lunar origin. It is also suggested that a group of stony meteorites, also found in Antarctica, may be from Mars.

E-29041

Elverhöi, A., Roaldset, E., **Glaciomarine sediments and suspended particulate matter, Weddell Sea shelf, Antarctica,** *Polar research,* Oct. 1983 1(1), p.1-21, 65 refs.

Samples of glaciomarine sediments and suspended matter from the eastern and central Weddell Sea shelf were collected during the Norwegian Antarctic Research Expedition (NARE) in 1978/79. Ice-rafted clastic materials are in general the main sediment sources. On the eastern shelf, biogenic materials are abundant (sponges and bryozoan debris). Fine-grained materials, clastic and bioclastic, are additionally supported as fecal aggregates and by currents. The composition of the bottom sediments shows only small variations laterally and within the profiles. Dissolution of the biogenic materials appears to be slight. The suspended matter is dominated by fine silt and clay particles of clastic, biogenic (mainly diatoms) and authigenic (Fe, Mg-rich silicates) origin. Metalliferous particles (Fe, Ti, Zn, Cr, Ni-rich) of possibly anthropogenic and/or cosmic origin are observed. On the upper continental slope and the outer shelf the sedimentation rates are in the range of 2-5 cm/1000 years, which are slightly higher than for the rest of the shelf. The bioclastic glaciomarine deposits grade southward into bioclastic free sediments, showing that glaciomarine deposits outside an ice shelf may form a sequence of alternating bioclastic-rich and bioclastic-free layers. Similarly, late Precambrian carbonate tillite sequences, especially in the case of thin carbonate layers interbedded with tillite layers, may reflect variations in glaciomarine facies rather than interglacial/glacial cycles. (Auth.)

E-29057

Milanovskiĭ, E.E., **Rift formation in the Earth's history (rifts in early plates)** [Riftogenez v istorii Zemli (riftogenez na drevnikh platformakh)], Moscow, Nedra, 1983, 280p., In Russian. 198 refs.

In a chapter on the Antarctic plate (p.227-232) the geological history and topography of Antarctica are reviewed and the types of tectonic zones are described in terms of age, structure and composition. The position of three generations of rifts in the tectonic structure is illustrated, and the theory of continental drift is discussed.

E-29071

Meneilly, A.W., **Deformation of granitic plutons in eastern Palmer Land,** *British Antarctic Survey. Bulletin,* Nov. 1983 No.61, p.75-78, 9 refs.

Schists and gneisses in eastern Palmer Land and supposed metasedimentary and metavolcanic rocks at Engel Peaks have been shown to be deformed granitic plutons. Thus metamorphic rocks in Palmer Land, previously thought to be pre-late Palaeozoic sialic basement, may be sheared Mesozoic plutons and the presence of exposed basement rocks in Palmer Land has yet to be proven. Deformation took place in major shear zones that generally dip westwards at moderate angles and which involve mainly dip-slip displacement. The brittle nature of the deformation at the margin of the Engel Peaks fault zone contrasts markedly with the more ductile shearing of the plutonic rocks elsewhere in eastern Palmer Land. It is possible that the former represents a higher structural level of erosion within an area of contemporaneous shearing. (Auth.)

E-29078

Brady, H., McKelvey, B., **Some aspects of the Cenozoic glaciation of southern Victoria Land, Antarctica,** *Journal of glaciology,* 1983 29(102), p.343-349, In English with French and German summaries. 12 refs.

Palaeoglacial evidence at three sites in southern Victoria Land has been examined to consider the possible uplift of the Transantarctic Mountains through the East Antarctic ice sheet prior to the Middle Miocene. A cenozoic tillite at Mount Feather and a striated pavement at Mount Brooke pre-date uplift. Another tillite remnant adjacent to Odell Glacier near Mount Brooke post-dates the uplift and is locally derived. This tillite, together with the Mount Feather tillite, has been previously placed in the Sirius Formation, a term that the authors abandon as it covers tillites of varying ages. Basement complex derived clasts in the Mount Feather tillite, previously reported by these authors, could be inherited from the Jurassic Mawson Formation or the Permian Metschel Tillite but they still provide evidence that the Mount Feather tillite was deposited by a regional glaciation. (Auth.)

E-29079

Corte, A.E., **Geocryogenic morphology at Seymour Island (Marambio) Antarctica: a progress report,** International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.192-197, 19 refs.

At Seymour Island, 64 deg 14 min S and 56 deg 38 min W, Antarctica under a mean annual temperature lower than -10 C, various geocryogenic forms are observed including frost-contraction cracks and polygons, frost domes and pingos, gelifluction features, etc. These first forms require cold permafrost with mean annual temperatures below -5 C. The geocryogenic processes at both sides of the Antarctic Peninsula are compared. In the west part, geocryogenic processes of Deception are compared including sorting and gelifluction features, which formed at -2.8 C. On the east side forms requiring lower temperatures are observed, including thermal-contraction cracks and polygons, pingos and frost domes; they are formed under mean annual temperature of -10 C or lower. The mountain chain of the Peninsula works as a barrier for the cold winds of the Weddell Sea resulting in frigid conditions all along the east sector of the Peninsula. Temperature differences of about 8-9 C are observed at the same latitude on the east and west sides. The strong southwest winds with a snow and debris load produce a remarkable phenomenon: snow drift-dammed lakes. (Auth. mod.)

E-29110

Storey, B.C., Meneilly, A.W., **Mélange within subduction-accretion complex rocks of Fredriksen Island, South Orkney Islands,** *Geological magazine,* Nov. 1983 120(6), p.555-566 + 7 plates, 32 refs.

A mélange on Fredriksen Island, South Orkney Islands, is part of a Mesozoic subduction-accretion complex which formed along the western, Pacific side of Gondwana. It consists of a chaotic arrangement of irregular sized blocks, up to 8 m across, of basic pillow lava, chert, felsite and epiclastic sandstone in a pervasively sheared cataclastic matrix. Inclusions are typically lozenge-shaped and are characteristic of a tectonic mélange. As the mélange incorporates both possible ocean floor material that was accreted onto the continental margin and inner slope basin sediments it probably formed beneath the trench-slope basin along a shear zone at a high level in the subduction complex. (Auth.)

E-29111

Nagata, T., ed, **Proceedings of the Third Symposium on Antarctic Geosciences, 1982,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, 289p., Refs. passim. For selected papers see 38-1549 through 38-1555 or E-29116, E-29117, E-29120 through E-29126, E-29129, F-29112, F-29127, F-29128, F-29131, F-29132, J-29113, J-29130, L-29114, L-29115, L-29118 and L-29119.

The volume is composed of 21 full papers plus 12 submitted in abstract form only. Papers deal with topics in geophysics, geology, petrology, mineralogy, geochemistry, glaciology, and geomorphology.

E-29116

Takanami, T., Kaminuma, K., Terai, K., Osada, N., **Seismological observations on Mount Erebus, Ross Island, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.46-53, 7 refs.

Two high sensitivity seismic networks were installed during the 1980-1981 austral summer field season on Ross Island. One was a three-station radio telemetry network, and the other a six-station network with long-life portable data recorders. The latter was in place around the main crater near the summit from December 20, 1980 to January 6, 1981. In spite of a wild and harsh environment for the seismic observations, many volcanic earthquakes were recorded by the seismic networks. 111 shallow events were located using the data of the two networks; hypocenters clustered beneath the summit in a range from near the surface to 6 km. Many events accompanied by explosive eruptions were recorded at summit stations around the main crater. (Auth.)

E-29117

Shibuya, K., Baba, M., Kienle, J., Dibble, R.R., Kyle, P.R., **Study of the seismic and volcanic activity of Mount Erebus, Antarctica, 1981-1982,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.54-66, 7 refs.

In order to monitor the long-term seismicity of Mount Erebus, Antarctica, seismic observations have been made since 1980 using radio-telemetered and local networks. From the observations in the 1981-1982 field season we determined the hypocenters of 162 local events. The hypocenters are divided into group I with focal depths ranging from the elevation of the summit to sea level, and group II with depths ranging from sea level to 15 km. The epicenters of group I earthquakes are concentrated 1 to 2.5 km north-northeast of the summit crater, and have a nearly vertical focal depth distribution. They are accompanied by infrasonic signals of two distinct waveform types, which allowed the earthquakes to be classified into two sub-sets, called arbitrarily *a*- and *b*-type events. There are about twice as many *a*-type as *b*-type events. The epicenters of the deeper *a*-type events are more tightly clustered than those of the shallower *b*-type events. (Auth. mod.)

E-29120

Okuda, Y., Yamazaki, T., Sato, S., Saki, T., Oikawa, N., **Framework of the Weddell Basin inferred from the new geophysical and geological data,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.93-114, 24 refs.

Results of geological and geophysical surveys in the Weddell Sea suggest that the sea has two sedimentary basins. The eastern one may extend to the Queen Maud Basin off the Queen Maud Land of East Antarctica, and the western one is developed at the back of the Antarctic Peninsula. The age of the basements of the basins is tentatively assigned to Late Jurrasic-Early Cretaceous. The "Weddell Sea Unconformity" by Hinz is recognized on the continental slope off the Princess Martha Coast. The unconformity is well developed on the outer margin of the basement of the basin on the continental shelf. From these geological and geophysical data, the authors discuss two hypotheses about generation of the Weddell Sea Floor in this paper. One is that the Weddell Sea seems to have been a marginal sea at the back of the island arcs during Late Jurassic to Early Cretaceous, judging from paleontological and seismic reflection data. The other is that the sea floor may have spread during Late Jurassic to Early Tertiary, judging from weak magnetic lineations in the ENE-WSW trend. (Auth.)

E-29121

Hiroi, Y., Shiraishi, K., Yanai, K., Kizaki, K., **Aluminum silicates in the Prince Olav and Soya Coasts, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.115-131, 36 refs.

This paper presents the regional distribution and textural features of aluminum silicates (kyanite, sillimanite, and andalusite) in the Prince Olav and Soya Coasts. The data make it clear that the regional metamorphism, probably Late Proterozoic in age, was of the medium-pressure type and that the regional metamorphic rocks locally underwent the retrograde alteration, including local development of andalusite, during the Early Paleozoic thermal event contemporaneous with the emplacement of granite and pegmatite. (Auth.)

E-29122

Suzuki, M., **Preliminary note on the metamorphic conditions around Lützow-Holm Bay, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.132-143, 28 refs.

The metamorphic conditions in the Lützow-Holm Bay region during the main phase of the granulite facies metamorphism (perhaps around 1000 Ma) are preliminarily estimated by the use of experimentally determined mineral breakdown curves and of some geothermometers and geobarometers. Calculated conditions are in the range of 725 C and 6.3 kb. The values suggest that the region has undergone metamorphic conditions similar to Molodezhnaya Station and Prince Charles Mountains, each of which is considered to belong to the zone affected by the granulite facies metamorphism around 1000 Ma. The metamorphic conditions estimated here seem to be compatible also with those in the western part of the Prince Olav Coast. (Auth.)

E-29123

Yoshida, M., Aikawa, N., **Petrography of a discordant metabase from Skallen, Lützow-Holmbukta, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.144-165, 34 refs.

A discordant metabasite from Skallen is an olivine tholeiite resembling petrochemically some of the Proterozoic Amundsen dikes of Enderby Land. Field occurrence, mineral association, and microstructure including zoning structure of minerals are not incompatible with an earlier polymetamorphic interpretation of the area. They indicate that the rock intruded synchronously with or earlier than previous tectono-metamorphic events. Microprobe analyses and compositional zoning of constituent minerals of the metabasite are presented and some temperature and pressure values are calculated utilizing five different geothermometers and a geobarometer. It is stressed that the peak of a dominant metamorphism is considered to have reached the temperature much higher than 823 C whatever the metamorphic history might have been. (Auth. mod.)

E-29124

Matsueda, H., Motoyoshi, Y., Matsumoto, Y., **Mg-Al skarn of the Skallevikhalsen on the east coast of Lützow-Holm Bay, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.166-182, 16 refs.

The genesis of skarns that accompany crystalline marbles in the Skallevikhalsen Hills region on the east coast of Lützow-Holm Bay, is discussed on the basis of the mode of occurrence and mineral paragenesis. The marbles in question are usually accompanied by distinctly zoned nodules that are thought to have been formed during the granulite facies metamorphism by the interaction of dolomitic limestones and exotic rock fragments incorporated in them. Examination in the CaO-MgO-Al2O3-SiO2 system leads to the conclusion that the mineral parageneses observed in these skarns have been largely controlled by the chemical potentials of Mg, Al and Si. In addition, the significance of the occurrence of some semi-precious minerals, such as sapphire and spinel, is also briefly discussed in relation to similar minerals from Sri Lanka and southern India and the reconstruction of Gondwanaland. (Auth.)

E-29125

Shiraishi, K., Asami, M., Kanaya, H., **Petrochemical character of the syenitic rocks from the Yamato Mountains, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.183-197, 19 refs.

Syenitic rocks occupying an area of at least 400 sq km in the Queen Fabiola Mountains are classified into three major types on the basis of the field occurrence and petrography; two-pyroxene syenite, clinopyroxene quartz monzo-syenite and clinopyroxene syenite. Major and trace elements Rb, Sr, Zr, Th and U are presented to reveal the petrochemical features of the syenitic rocks. The two-pyroxene syenite which has a charnockitic appearance is the earlier member among the syenitic rocks. The spacial relation between the clinopyroxene quartz monzo-syenite and the clinopyroxene syenite is not observed. All the syenitic rocks show roughly smooth trends in the major elements variation diagrams, but they overlap extensively with increasing SiO2. The Rb, Th and U contents of the syenitic rocks are similar to those of the average crust, and Sr and Zr are much more enriched than the ordinary granitic rocks. (Auth. mod.)

E-29126

Asami, M., Shiraishi, K., **Mineral parageneses of basic to intermediate metamorphic rocks in the Yamato Mountains, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.198-214, 13 refs.

Two groups of metamorphic rocks are found in association with syenitic and granitic rocks in the Queen Fabiola Mountains; Group I includes two-pyroxene-bearing gneiss and amphibolite, whereas Group II consists of granitic gneiss and associated rocks accompanied by no orthopyroxene. Mineral parageneses of basic to intermediate metamorphic rocks of the two groups were examined in the simplified system Al2O3-FeO-MgO-CaO-Na2O. Although no direct contact between the granulite-facies and amphibolite-facies metamorphic rocks has been found in the Queen Fabiola Mountains, the geological and petrological relations of the syenitic rocks to the metamorphic rocks suggest that the granulite-facies rocks and the syenitic rocks form a geological unit which is in tectonic contact with the other geological unit composed of the amphibolite-facies rocks. (Auth. mod.)

E-29127

Nomura, R., **Foraminifera from the raised beach deposits on the east coast of Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.219-230, 17 refs.

Sediment samples collected from raised beach deposits (1.5-11.5 m a.s.l.) of East Ongul Island in Lützow-Holm Bay, Langhovde-kita Point and Skarvsnes Foreland 30 mi. south, are analyzed for foraminiferal assemblages. Twenty-eight species belonging to 24 genera are identified, of which 19 species named here are newly recorded. The assemblage characterized by the predominance of *Globocassidulina biora* (Crespin) and *Cassidulinoides porrectus* (Heron-Allen and Earland) suggests that the sediments of raised beaches have been originally deposited at depths shallower than 30-50 m. (Auth. mod.)

E-29129

Yoshida, Y., Moriwaki, K., **Landform of Mt. Riiser-Larsen, Amundsen Bay, Enderby Land: Results of a preliminary survey,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.240-246, 8 refs.

Reconnaissance survey of the Mt. Riiser-Larsen area, Enderby Land, was carried out by Japanese field party in February 1982. Geomorphological observation and airphoto interpretation enable us to describe some geomorphic features of the area. Glaciated landforms and the classified morainic features appear to indicate the following events: The formation of alpine landforms prior to the growth of the ice sheet, inundation by the expanded ice sheet up to the summit, retreat of the ice sheet to the present level intervened by one considerable standstill, formation of local cirque glaciers and their extinction. The major ice retreat might have taken place before the last glaciation of the Northern Hemisphere. (Auth.)

E-29133

Walton, D.W.H., Heilbronn, T.D., **Periglacial activity on the subantarctic island of South Georgia,** International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.1356-1361, 14 refs.

Very little information is available on periglacial features and activity on the subantarctic islands. From measurements on South Georgia gelifluction is observable to a depth of 12 cm at very active sites but most sites show movement only to 8 cm. For small scale stripes sorting is generally 5-6 cm deep with the majority of sorting activity in autumn. Altitude appears to affect sorting through the incidence of freeze-thaw cycles, with east facing sites showing most activity. Stripe orientation is not related to wind direction. The rate of clast movement downslope was linearly related to clast length and site slope. (Auth.)

E-29134

Medina, F.A., Ramos, A.M., **Geology of Ameghino refuge neighborhood (64 deg 26 min S, 58 deg 59 min W) San Martin Land. Antarctic Peninsula** [Geología de las inmediaciones del Refugio Ameghino (64 26 S, 58 59 W) Tierra de San Martin. Península Antártica], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.229, 14p., In Spanish with English, French and German summaries. 16 refs.

The geology of the neighborhood of Ameghino refuge is described. The name of Formación Ameghino is proposed for the clastic marine sequence composed by argillites and shales with subordinate sandstones and sinters, the faunistic association of which indicate an Upper Oxfordian-Lower Kimmeridgian age. These sediments are intruded by two dikes: the older, of andesitic composition is assimilable to the Volcanic Group of the Antarctic Peninsula (Upper Jurassic-Lower Cretaceous); the other dike, of basaltic composition, is assigned to the James Ross Volcanic Group (Miocene-Pliocene). (Auth.)

E-29136

Drago, E.C., **Limnological study of Potter Peninsula (South Shetland Islands): morphology of the lenitic environment** [Estudios limnológicos en la península Potter, Isla 25 de Mayo (Shetland del Sur): morfología de ambientes lenítícos], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.265, 20p., In Spanish with English, French and German summaries. 8 refs.

Geomorphological characteristics of the lenitic environments in Potter Peninsula and its drainage basins are described. These water bodies, with depths no more than 6.50 m, have a floor of gravel and silt broken by jutting rocks. For all of them the shoreline is one of submergence and it appears to be unaffected by hydromechanical activity. Some of the more important morphometric parameters of the lakes are given and possible origins of these freshwater environments are discussed. (Auth.)

E-29156

Toubes Spinelli, R.O., **Geology of Bertrab Nunatak, Argentine antarctic sector** [Geología del nunatak Bertrab, sector Antártico Argentino], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.296, 9p., In Spanish with English, French and German summaries. 6 refs.

The Bertrab Nunatak (77 44'S - 34 48'W)), Argentine Belgrano II Station site, is a very small outcrop of reddish gray to gray mottled white and reddish granite. Riolithic porphyry, granitic porphyry and spessartite veins, at least two occupying fault planes, intrude it. There are also barite, with amethyst and milky quartz veinlets. The strong jointing gives to the outcrop the aspect of a prominent fractured surface. In comparison with similarly dated rocks of nearby nunataks (Moltke, Littlewood) the age of this granite is judged to be Upper Precambric. (Auth.)

E-29163

Behr, H.J., Kohnen, H., Peters, M., Spaeth, G., Weber, K., **Geological expedition to the Kraul Mountains, western New Schwabenland, Antarctica—report on its events and preliminary results** [Die geologische Expedition zu den Kraul-Bergen, westliches Neuschwabenland/Antarktika—Bericht über ihren Verlauf und erste Ergebnisse], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.13-26, 4 refs., In German.

An ambitious geological research program is outlined with changes required right at the start. The large helicopter became irreparable on its first flight causing the cancellation of the work plans in the Heimfrontfjella and a major revision of proposed activities. The geology of the Kraul Mountains is described in terms of topographic features, Permian sediments, volcanic rocks, dykes and sills, deformed plains and fissures, volcanic aging and mineralization, salt weathering, magmatite aging, and the geodynamic environment of the volcanoes. Charts and photographs of the work areas are included.

E-29172

Weaver, F.M., Gombos, A.M., Jr., **Southern high-latitude diatom biostratigraphy,** Society of Economic Paleontologists and Mineralogists. Special publication no.32, Deep sea drilling project: a decade of progress. Based on a symposium sponsored by SEPM-AAPG, held at the Annual Meeting, Houston, Texas, 1979, edited by J.E. Warme, R.G. Douglas, and E.L. Winterer, Tulsa, Oklahoma, 1981, p.445-470, Refs. p.464-470.

DLC GC377.D43

The development of Cenozoic and Mesozoic southern high-latitude diatom biostratigraphy over the past fifteen years is summarized with emphasis on significant advancements resulting from deep-sea drilling in the Antarctic and Sub-Antarctic regions. A regionally applicable Neogene diatom zonation is proposed, utilizing easily recognizable species with broad geographic distribution. This biostratigraphic framework consists of five previously defined and six modified zones from DSDP Legs 28 and 29 reports. In addition, five new zones are proposed and sixteen datums documented, having apparent regional significance. Provided are: the datums used for geochronologic subdivision and the correlation of epoch boundaries in Sites 266 and 278, floral references for all stratigraphically significant species, and a comprehensive bibliography on southern ocean diatoms. (Auth.)

E-29173

Valle, R.A. del, Fourcade, N.H., Medina, F.A., **Geology of the northern end of the eastern border of the Antarctic Peninsula and adjacent islands, between 63 deg 25 min and 65 deg 15 min S** [Geología del extremo norte del borde oriental de la península Antártica e islas adyacentes entre los 63 25 y los 65 15 de latitud Sur], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.276, 14p., In Spanish with English, French and German summaries. 26 refs.

Along all the northern end of the eastern border of the Antarctic Peninsula and adjacent islands an extended sedimentary basin exists which has developed since the Upper Jurassic as the result of the Weddell Sea opening. The distribution of Mesozoic vulcanites and the petrological characteristics of subordinate sediments suggest the existence of a special type of basin developed behind a magmatic arch active during the Jurassic, Cretaceous and lower Tertiary inclusive. The sedimentation is documented since the Upper Oxfordian until the Upper Cenozoic and it has characteristics showing that it took place preferably in shallow seas. The maximum sedimentation of the basin would have been produced during the Upper Cretaceous (Campanian). During the Cenozoic upper third, new volcanic manifestations took place, being this time within the basin inner marginal limits, in sectors situated toward the east of the remains of Mesozoic magmatic arch. (Auth. mod.)

E-29174

Palme, H., **Meteorites from the Moon and Mars** [Meteorite von Mond und Mars], *Naturwissenschaften,* Nov. 1983 70(11), p.563-565, In German. 9 refs.

The discovery of the ALHA 81005 meteorite and the establishment of its lunar origins are discussed. The 32g specimen was found in the Allan Hills region and was examined at the Max Planck Institute where chemical and mineralogical tests brought out its similarities to lunar rocks. EETA 7901 was identified as being of Martian origin on the basis of its mineral composition of Shergottite, Nakhlite, and Chassignite and its age determination of 3.2 billion years.

E-29197

Molnia, B.F., ed, **Glacial-marine sedimentation,** New York, Plenum Press, 1983, 844p., For selected individual papers see 38-1711 through 38-1718 or E-29198 through 29200. Numerous refs.

DLC GC380.15.G56 1983

This volume of 18 papers describes the glacial-marine sedimentary environment in a variety of temporal and spatial settings. The primary emphasis is the characterization of Quaternary glacial-marine sedimentation to show (1) the significant differences that exist between glacial-marine environments in different geographic settings and (2) their resulting glacial-marine deposits and facies. Additionally, papers describing ancient glacial-marine environments are also presented to illustrate lithified analogs of the Quaternary deposits. The wide-ranging papers examine the Quaternary glacial-marine sedimentary picture in subarctic Alaska, Antarctica, the Arctic Ocean, the Kane Basin, Baffin Island, the Puget-Fraser Lowland, the North Atlantic Ocean, southern Alaska, the Karoo Basin of South Africa, and the Precambrian Mineral Fork Formation of Utah. (Auth. mod.)

E-29198

Anderson, J.B., **Ancient glacial-marine deposits: their spatial and temporal distribution,** Glacial-marine sedimentation, edited by B.N. Molnia, New York, Plenum Press, 1983, p.3-92, Refs. p.60-92.

DLC GC380.15.G56 1983

A number of different criteria for recognizing glacial-marine deposits and for distinguishing them from other glacial and nonglacial deposits exist. Using these criteria this paper attempts to define the spatial and temporal distribution of glacial-marine deposits. The objective is to stress the importance of these deposits by the nature of their great spatial and temporal distribution. This has been a difficult task because there is seldom any good consensus as to the origin of diamictites and pebbly mudstones. Glacial-marine deposits are surely widespread, both in time and space, but the very controversy that stems over their interpretation is an equally important point in stressing that high latitude seas are perhaps the most complex and poorly understood sedimentary environment on earth. Materials from antarctic waters are used to aid in defining the global distribution of the deposits. (Auth. mod.)

E-29199

Anderson, J.B., Brake, C., Domack, E., Myers, N., Wright, R., **Development of a polar glacial-marine sedimentation model from antarctic Quaternary deposits and glaciological information,** Glacial-marine sedimentation, edited by B.N. Molnia, New York, Plenum Press, 1983, p.233-264, 51 refs.

DLC GC380.15.G56 1983

The West Antarctic ice sheet is presently grounded to depths greater than 1000 m below sea level over large areas. Glacial-marine sedimentation is dominated by ice-rafting; meltwater input is presently lacking. Rather, the supply of terrigenous sediment to the continental shelf by glaciers is presently dominated by biogenic sedimentation. Most sediment is transported as basal debris and is deposited either as lodgment till or near the grounding line beneath the ice shelf. Seaward of the ice shelf, marine currents winnow finer ice-rafted particles and redistribute them so that glacial-marine sediments tend to be better sorted than lodgment tills. Waxing and waning marine ice sheets deposit widespread glacial and glacial-marine facies. In the coastal regions and along mountainous portions of the coast, ice drainage is mostly confined to outlet glaciers and to a much lesser extent to ice walls. Marine sedimentation in these regions is very different from that which occurs in marine ice sheet environments, primarily in the more restricted nature of facies and the greater marine influence on shelf sedimentation. Mass flow processes, particularly debris flows and turbidity currents, play key roles in redistributing glacial deposits. A simple sedimentation model for glacial-marine sedimentation in deep basins and under polar conditions is presented. (Auth.)

E-29200

Wright, R., Anderson, J.B., Fisco, P.P., **Distribution and association of sediment gravity flow deposits and glacial/glacial-marine sediments around the continental margin of Antarctica,** Glacial-marine sedimentation, edited by B.N. Molnia, New York, Plenum Press, 1983, p.265-300, 30 refs.

DLC GC380.15.G56 1983

This paper discusses the known distribution of sediment gravity flow deposits around the Antarctic continental margin, emphasizing the association of these mass transport deposits with glacial and glacial-marine sediments. Variations in glacial, bathymetric, and oceanographic conditions appear to most significantly influence the final distribution of slump deposits, debris flow deposits, and turbidites in the Weddell, Ross, and Bellingshausen Seas, and along the Wilkes Land Coast. (Auth. mod.)

E-29202

Richter, W., Strauch, G., **Deuterium and O-18 variations in the lakes of the Schirmacher Oasis (East Antarctica),** *Isotopenpraxis,* 1983 19(5), p.145-153, 23 refs.

A snow and icefree rock area the Schirmacher Oasis (Dronning Maud land) is situated on the coast of the Antarctic continent, between inland and shelf ice. In the the area of the oasis different exogenic conditions have produced multiform types of lake basins. First results about isotope hydrological relations in the lakes of the Schirmacher Oasis are discussed. The lakes can be classified by isotope hydrological parameters into different groups. The classification depends on in-and outflow, evaporation processes, nature of inflow and location. (Auth.)

E-29216

Matveenkov, V.V., Baranov, B.V., **Magmatic rocks from the Macquarie Ridge, southwestern Pacific** [Magmaticheskie porody khrebta Makkuori (IUgo-zapadnaia chast' Tikhogo okeana)], *Akademiia nauk SSSR. Izvestiia. Seriia geologicheskaia,* 1979 Vol.9, p.17-27, In Russian. 19 refs.

Petrochemical study of rock composition of the Macquarie Ridge, running along the border of the Pacific and Indian Ocean lithospheric plates, shows a variety of effusive, intrusive and subvulcanic rocks pertaining to oceanic tholeiites. Intrusive rocks include ultrabasites and a range of troctolites, ferrodiorites and granophyres. The composition of most rocks displays elements typical of the oceanic crust.

E-29223

Pankhurst, R.J., Smellie, J.L., **K-Ar geochronology of the South Shetland Islands, Lesser Antarctica: apparent lateral migration of the Jurassic to Quaternary island arc volcanism,** *Earth and planetary science letters,* Dec. 1983 Vol.66, p.214-222, 42 refs.

Approximately 70 K-Ar whole-rock ages for low-K tholeiitic and andesitic volcanic and intrusive rocks from the South Shetland Islands, Antarctica, including about 50 not previously published, are reviewed. Activity mainly spanned the range 130 to 30 Ma (Jurassic/Cretaceous to Oligocene/Miocene) with a very recent (- 2 Ma), more alkaline, renewal. Throughout the main period of activity magmatism (or, perhaps, its cessation) migrated continuously northeastwards along the length of the island chain. (Auth.)

E-29237

Leckie, R.M., Webb, P.N., **Late Oligocene-early Miocene glacial record of the Ross Sea, Antarctica: evidence from DSDP site 270,** *Geology,* Oct. 1983 5(11), p.578-582, 27 refs.

Foraminifera from the Ross Sea are used to trace an early phase of glaciation. The central Ross Sea underwent significant bathymetric and oceanographic evolution with the inception of glaciomarine sedimentation, resulting in the sequential development of four contrasting foraminiferal populations (assemblage zones). Gradual climatic change in the Ross Sector during latest Paleogene-early Neogene time culminated in major ice build-up by the late early Miocene. Conclusions derived from our microfaunal studies reaffirm climatic and oceanographic trends interpreted from oxygen-isotope data for sub-Antarctic deep sea sites north of the Ross Sea. Intensification of glaciation within the Ross Sea area may be responsible for the increase in production of Antarctic Bottom Water and associated development of widespread early Neogene deep-sea hiatuses reported from lower latitude regions. (Auth.)

E-29238

Faure, G., Taylor, K.S., Mercer, J.H., **Rb-Sr provenance dates of feldspar in glacial deposits of the Wisconsin Range, Transantarctic Mountains,** *Geological Society of America. Bulletin,* Nov. 1983 94(11), p.1275-1280, 29 refs.

Glacial deposits in the Wisconsin Range include a deposit of till on the summit plateau at an elevation of 2,500 m above sea level and glaciolacustrine sediments along the Reedy Glacier. The plateau till and underlying sediments consist of six units that appear to record the replacement of ice-free, periglacial conditions by ice cap glaciation of pre-Pleistocene age. Alternatively, the plateau till may have been deposited by the East Antarctic ice sheet either when it was thicker than at present or when the Wisconsin Range was lower in elevation. Feldspar size fractions define a straight line on a Rb-Sr isochron diagram and yield a date of 480 Ma that is indistinguishable from the age of the granitic basement rocks of the Wisconsin Range dated previously. This result therefore supports the hypothesis that the plateau till was deposited by a local ice cap and suggests that the Wisconsin Range was sufficiently elevated to permit an icecap to form prior to the growth of the East Antarctic ice sheet. (Auth. mod.)

E-29241

Rabassa, J., **Stratigraphy of the glacigenic deposits in northern James Ross Island, Antarctic Peninsula,** Tills and related deposits: genesis, petrology, application, stratigraphy, edited by E.B. Evenson, C. Schlüchter, and J. Rabassa; INQUA Symposia on the Genesis and Lithology of Quaternary Deposits/USA 1981/Argentina 1982, Rotterdam, Netherlands, A.A. Balkema, 1983, p.329-340, 23 refs.

Six drift units which are considered to be related to five main glacial episodes have been recognized in northern James Ross Island. Marine shells have been radometrically dated and suggest Wisconsin, Lower Holocene, Upper Holocene and Present ages for the four younger drifts, respectively. The glaciers which deposited these units were of the mountain ice-sheet type and peninsular origin for the two oldest drifts. The four remaining units were generated by outlet glaciers which were occupying valleys and with a locally-derived debris load. These ice-bodies were, at least partly, wet-based; that is, the temperature at their basal portion was at or above the pressure-melting point. Several raised marine beaches show the existence of isostatic up-lifting of the island, which could have probably reached mean annual values of 2 to 4 mm. Part of this up-lifting could have been related to glacioisostatic recovery due to ice-cover loss. (Auth.)

E-29280

Jones, L.M., Faure, G., Taylor, K.S., Corbato, C.E., **Origin of salts on Mount Erebus and along the coast of Ross Island, Antarctica,** *Isotope geoscience,* 1983 Vol.1, p.57-64, 19 refs.

Salt deposits in the form of crusts and efflorescences are a common feature of rock exposures along the coast of Ross Island and on the summit of Mt. Erebus. The 87 Sr/86 Sr ratios of salts from coastal sites decrease with increasing elevation, but may also vary along the coast in response to the seasonal duration of open water. The variation of 87 Sr/86 Sr ratios can be attributed to mixing of marine Sr with Sr derived from the volcanic rocks and confirms the importance of chemical weathering as a source of Sr in these secondary salts. Yellow salts of complex mineralogical composition from the summit of Mt. Erebus have 87 Sr/86 Sr ratios whose average is 0.70345. This value is consistent with the hypothesis that these salts formed both from the plume of volcanic gases emanating from a convecting lava lake of phonolitic composition and by chemical weathering of the volcanic rocks. (Auth. mod.)

E-29292

Bud'ko, V.M., **Geological interpretation of satellite images of Antarctica** [Geologicheskoe deshifrirovanie kosmicheskikh snimkov Antarktidy], *Issledovanie Zemli iz kosmosa,* Nov.-Dec. 1983 No.6, p.52-59, In Russian with English summary. 6 refs.

Possibilities of revealing subglacial geological features on satellite images of the ice sheet surface are discussed. Regional faults of different dimensions, ring and block structures were recognized in the surface relief of the thick and almost immobile ice cover in the area studied. Accuracy of the interpretation was sustained by the tectonic scheme of the region compiled from geophysical data during the 22nd and 23rd Soviet Antarctic expeditions.

E-29297

Lomize, M.G., **Volcanic belt of the eastern margin of Gondwanaland** [Vulkanicheskiĭ poias vostochnogo kraia Gondvany], *Russia. Ministerstvo vysshego i srednego spetsial'nogo obrazovaniia. Izvestiia vysshikh uchebnykh zavedeniĭ. Geologiia i razvedka,* Feb. 1978 No.2, p.64-71, In Russian. 28 refs.

Reconstruction of the Mesozoic volcanic belt covering an area of approximately 9000 km, from Papua to the Antarctic Peninsula, is presented by a map and by a description of the characteristics of its segments. Geological features of the antarctic segment, which covers an area of 4000 km—from Saunders Mountain in Marie Byrd Land to the Antarctic Peninsula—are reviewed. The morphological fit of Australia and Antarctica is discussed, as are the tectonic plates of the southern part of the Antarctic Peninsula and their relation to the southern Andes.

E-29300

Alfaro H., G., Collao I., S., **Mineral exploration on Anvers and Brabant Islands, Antarctic Peninsula: preliminary results** [Exploración minera en las islas Anvers y Brabante, Península Antártica: resultados preliminares], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.39-47, In Spanish with English summary. 6 refs.

Preliminary results of mineral exploration on Anvers and Brabant Islands, Antarctic Peninsula, made during the expedition INACH 19, are reported. Four main stratified sequences are recognized. From oldest to youngest, they are: vulcanites of Wiencke Island (Upper Cretaceous); conglomerate of Ryswyck Point (Post Upper Cretaceous); sedimentites of Spallanzany Point, and columnar vulcanites of Buls Bay (Pleistocene). Two main granitic intrusives, named Granito Mónaco and Granodiorita Isla Anvers have been identified. Copper and iron sulfide mineralization (chalcopyrite and pyrite), associated with volcanic and intrusive rocks, are abundant. Magnetite and hematite in andesite-basaltic rocks of the Vulcanites of Wiencke Island, in the northern part of Brabant Island, are common. Felsic dykes with pyrite and traces of chalcopyrite, molibdenite and gold, are located in granitic intrusions. Chalcopyrite and pyrite associated to volcanic rocks and granitic rocks are common. Magnetite and hematite are frequently found in the northern part of Brabant Island. The economic importance of the different mineralization types is unknown. (Auth. mod.)

E-29301

Hervé, F., Pankhurst, R., Davidson, J., Mpodozis, C., **Scotia metamorphic complex at Cape Bowles, Clarence Island, South Shetland Islands** [El Complejo Metamórfico de Scotia en Cabo Bowles, Isla Clarence, Shetland del Sur, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.49-59, In Spanish with English summary. 9 refs.

Phyllite and schist samples from Cape Bowles, Clarence Island, have a relatively simple structure related to F2 isoclinal folding with axial S2 cleavage. Greenschist facies metamorphic mineralogy was developed during or shortly after production of S1. Relict mineralogy and total rock chemistry suggest a pre-metamorphic lithology of arenaceous sediments derived from an acid igneous terrane. Rb/Sr geochronological data show that metamorphism occurred during the same late Cretaceous (70-100 m.y.) event recorded elsewhere in the Scotia metamorphic complex and initial 87 Sr/86 Sr ratios are consistent with a Mesozoic rather than Precambrian source area. (Auth.)

E-29302

Stehberg L., R., Nilo F., L., **Mistaken antarctic origin of two projectile points** [Procedencia antártica inexacta de dos puntas de proyectil], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1983 No.30, p.61-76, In Spanish with English summary. refs.

Petrographic analyses of two projectile points supposedly found among benthic sediments collected in the vicinity of South Shetland Islands present sufficient differences, when compared with results of similar analyses of submarine sediments from the above location, as to indicate an origin other than the one originally ascribed to the two objects.

E-29307

Brewster, N.A., **Determination of biogenic opal in high latitude deep sea sediments,** Siliceous deposits in the Pacific region, edited by A. Iijima, J.R. Hein, and R. Siever, Amsterdam, Elsevier, 1983, p.317-331, Paper presented at Second International Conference on Siliceous Deposits in the Pacific Region, Tokyo-Akita-Kyoto, Japan, Aug. 1981. 22 refs.

DLC QE 495.S54 1983

The biogenic opal content of Antarctic deep sea sediments is estimated by subtracting isolated non-biogenic silica fractions from the total silica content of the samples. Quantitatively significant sources of non-biogenic silica in Antarctic Ocean sediments are clay-associated silica and detrital quartz. In this way, the relation is derived: BIOGENIC OPAL = TOTAL SIO2 -CLAY-ASSOCIATED SILICA -DETRITAL QUARTZ. Clay-associated silica is estimated from aluminum and magnesium concentrations in the sediment, using a normative calculation. Detrital quartz content is determined by X-ray diffraction.

E-29364

De Petre, A.A., Trubkin, S.P., **Mineralogical and physicochemical conditions of surface sediments on Seymour Island, Argentine Antarctica. 1. Larsen Cove** [Condiciones mineralogicas y fisico-quimicas de sedimentos superficiales de la isla Vicecomodoro Marambio (isla Seymour), Antártida Argentina. Primera parte. Caleta Larsen], Reunión Argentina de la Ciencia del Suelo, 11th, Paraná, Sept. 1980 [Proceedings], Santa Fé, Asociación Argentina de la Ciencia del Suelo, 1981, p.1209-1217, In Spanish. 5 refs.

Analysis of soil samples collected in Larsen Cove on Seymour Island shows particularities of Quaternary formations in the coastal areas, consisting of sand and lime. In the sub-plateau regions, the strata consist of a mixture of sand, lime and clay, typical of the Tertiary period. Endo- and exothermic effects, obtained by thermo-differential analysis, are tabulated.

E-29391

Barrett, P.J., Barrett, A.R., Pyne, A.R., Macpherson, A.J., **Observations on the sea floor of McMurdo Sound and Granite Harbor,** *New Zealand antarctic record,* 1983 5(2), p.16-22, 5 refs.

Cruise IV of USCGC *Glacier* (February 12-19, 1983) produced 1200km of bathymetry, much of it in areas previously uncharted, and seafloor samples from 26 sites. Several preliminary conclusions are drawn. The shipboard programme was designed to take several deep water sea floor samples not accessible from the sea ice, to sample off (and if possible in) Granite Harbor, and to obtain continuous depth records from previously uncharted areas in western McMurdo Sound. The ship's track and stations for bottom sampling are shown and station data given. (Auth. mod.)

E-29394

Thomson, M.R.A., Farquharson, G.W., **Discovery and significance of the ammonite genus *Favrella* in the Antarctic Peninsula area,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.7-14, 25 refs.

Ammonite fragments referable to the South American species *Favrella wilckensi* (Favre) are reported from Antarctica for the first time. They occur in a conglomerate-dominated sequence at Pedersen Nunatak on the east coast of Graham Land, from which a late Cretaceous microfauna has been extracted. However, *Favrella* is an early cretaceous (probably Hauterivian) genus and its anomalous occurrence in the Antarctic rocks suggests that the fragments are derived. A slump-induced turbidite origin for the conglomerates provides a mechanism for the mixing of the faunas. (Auth.)

E-29395

Hervé, F., Pankhurst, R.J., **Scotia metamorphic complex at Cape Bowles, Clarence Island, South Shetland Islands, Western Antarctica,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.15-24, 11 refs.

Phyllite and schist samples from Cape Bowles, Clarence Island, have a relatively simple structure related to F2 isoclinal folding with an axial S2 cleavage. Greenschist facies metamorphic mineralogy was developed during or shortly after production of S1; some mineral analyses are reported. Relict mineralogy and total rock chemistry suggest a pre-metamorphic lithology of arenaceous sediments derived from an acid igneous terrane. Rb/Sr geochronological data show that metamorphism occurred during the same late Cretaceous (70-100 Ma) event recorded elsewhere in the Scotia metamorphic complex and initial 87Sr/86Sr ratios are consistent with a Mesozoic rather than Precambrian source area.

E-29402

Storey, B.C., **Geology of South Georgia: V. Drygalski Fjord complex,** *British Antarctic Survey. Scientific reports,* 1983 No.107, 88p., Refs. p.85-88.

The Drygalski Fjord Complex represents a fragment of pre-Jurassic continental crust that was intruded by a wide variety of basic and plutonic rocks during the early stages of the formation of the Upper Mesozoic island-arc-back-arc basin system of South Georgia. Sedimentary and metasedimentary country rocks are divided into three spatially distinct formations. The Salomon Glacier Formation comprises siliceous paragneisses and layered migmatites regionally metamorphosed up to amphibolite facies. The Cooper Island and Novosilski Glacier Formations are deformed low-grade quartz-rich clastic sediments. Porphyritic felsites are tentatively assigned to the Novosilski Glacier Formation. Subsequent to deformation and metamorphism, magmatic activity commenced in the early Jurassic with emplacement of a sub-alkaline tholeiitic magma. As a result of the magmatic activity, a heterogeneous migmatite aureole surrounds the plutonic rocks. The basic, granitoid and metasedimentary country rocks are broken up, injected and net-veined by anatectic granitoid veins, and by emplacement of acid-basic intrusive breccias. It is concluded that the sediments and metasediments were probably deformed during the Gondwanian orogeny and that the magmatic activity of the Drygalski Fjord Complex may be the precursor of the basic magma which formed the floor of the Upper Jurassic-Lower Cretaceous island-arc-back-arc basin of South Georgia. (Auth. mod.)

E-29410

Kaminuma, K., **Activities of Japanese earth science research in the McMurdo Sound region in the 1982-1983 season,** *Antarctic record,* Dec. 1983 No.80, p.58-64, In Japanese with English summary. 7 refs.

Following research programs were carried out: Seismic observation by the telemetry network; Japanese scientists played back the magnetic tapes which have been recorded since September 1982. The daily frequencies of volcanic earthquakes occurring in and around Mt. Erebus were counted and earthquakes were scaled. Observations by a temporary seismic network; From November 15, 1982 to January 4, 1983, nine seismic temporary stations were established on the flank of Mt. Erebus for determining the earthquake locations with high accuracy. Gravity measurements; LaCoste-Romberg model G gravimeters were used at nine temporary seismic stations. Twenty additional gravity stations were also established around the summit crater of Mt. Erebus. (Auth. mod.)

E-29413

Zonenshaĭn, L.P., **Continental drift and Late Cenozoic glaciation of Antarctica** [Dreĭf kontinentov i pozdnekaĭnozoĭskoe oledenenie Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.5-15, In Russian. 15 refs.

The geological history of Antarctica is reviewed, with illustrations showing the disruption of the supercontinent Austramerica and the reconstruction of continents and oceans of the Southern Hemisphere by the drifting land masses. Australia was separated from Antarctica about 50 m.y.a. The oceanic passage between South America and Antarctica, the Bellingshausen Sea and the Drake Passage, appeared about 25 m.y.a. At that time the Antarctic Circumpolar Current developed and the antarctic ice sheet began to form.

E-29414

Losev, K.S., Podgornaia, L.I., Ushakov, S.A., **Paleoglaciology of Antarctica based on positions of lithospheric plates** [Paleogliatsiologiia Antarktidy (s pozitsiĭ tektoniki litosfernykh plit)], *Antarktika; doklady komissii,* 1980 No.19, p.16-22, In Russian. 15 refs.

Changes of the earth's shape in connection with the motion of lithospheric plates—continental drift in polar regions, changes of ocean circulation, changes of planetary albedo—are discussed in the light of geophysical evidence of the lowering of temperature in the earth's middle latitudes at the onset of Pleistocene, approximately 70 m.y.a. This phenomenon resulted in the development of Cenozoic glaciation of our planet, with mid-latitude temperatures of 10 to 12 C. Temperature variations were crucial in the formation of massive glaciation and its subsequent collapse. Impulses created by excentric changes of the earth's orbit are discussed in that connection.

E-29415

Verbitskiĭ, M.IA., Kvasov, D.D., **Causes of glaciation of Antarctica** [Prichiny oledeneniia Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.23-38, In Russian. Refs. p.36-38.

The causes of antarctic glaciation are investigated through mathematical experiments on the thermohydrodynamic model of a large ice sheet. Calculations show that an atmospheric cooling, occurring between the Eocene and the Oligocene—induced by the opening of a strait south of Australia and the development of the Antarctic Circumpolar Current—brought about the formation of the eastern antarctic ice sheet, co-existing with the relatively high temperatures of the surrounding ocean and the air above it. A new decrease in temperature occurred in the middle of Miocene, the Antarctic Circumpolar Current started to flow through the Drake Passage, and the glaciers expanded to western Antarctica. Glaciation of the south polar regions reached its maximum between Miocene and Pliocene as a result of the regression of the World Ocean. It is pointed out that future warming of the atmosphere, caused by human activity, could affect antarctic glaciers by contributing to their growth in eastern and to their reduction in western Antarctica.

E-29416

Serebriannyĭ, L.R., **Glaciation of Antarctica in the light of paleogeographic data** [Oledenenie Antarktidy v svete paleogeograficheskikh dannykh], *Antarktika; doklady komissii,* 1980 No.19, p.39-44, In Russian. 30 refs.

Evidence of the occurrence and duration of antarctic ice cover in Late Cenozoic is discussed. The onset of continental glaciation is dated between the Paleogene and the Neogene, the ice sheet finally forming in Middle Miocene, reaching its maximum toward the end of that period, circa 5 m.y.a. This conclusion is confirmed by paleogeographic reconstructions dealing with tectonic plates. The correlation of glaciation history of Antarctica and the evolution of the Mediterranean and the Caspian Sea basins is discussed. The time link of maximal glaciation in Antarctica and the regression of the Sea of Messina (Mediterranean) is pointed out. An outline of the development of antarctic glaciation in the Quaternary is presented.

E-29418

Grosval'd, M.G., **Glaciation of the antarctic continental shelf** [Oledeneniia kontinental'nogo shel'fa Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.54-79, In Russian. Refs. p.77-79.

On the basis of a review of Soviet and world literature, it is reported that the first glaciers appeared on Antarctica at the beginning of Eocene. In the first stage, 55 to 25 m.y.a., ice formed on the mountains; in the second stage, 25 to 5 m.y.a., it expanded to temperate sheet and only in the third, Pliocene Quaternary stage, from 5 m.y.a. to the present, did it become a polar sheet. In this, the last stage, the antarctic ice cover expanded even beyond dry land, to cover the continental shelf. The marine portions of the ice cover were more changeable than those covering the continent itself. With the cooling of the climate, they reached the very edges of the shelf; in the interglaciation period, break-downs occurred in which glacier surges played a major role.

E-29419

Bardin, V.I., **Paleoglaciological study of marine and continental Cenozoic sediments in the Antarctic** [Paleogliatsiologicheskie aspekty izucheniia morskikh i kontinental'nykh kaĭnozoĭskikh osadkov v Antarktide], *Antarktika; doklady komissii,* 1980 No.19, p.80-88, In Russian. Refs. p.86-88.

Development of antarctic glaciation in the Cenozoic is discussed, and literature of investigations carried out by marine geologists in the southern ocean, with data of paleoglaciological interest is reviewed, as are paleogeographic surveys carried out on the continent. A map is presented showing the areas where these investigations took place.

E-29423

Poliakov, M.M., **Cenozoic volcanism and history of antarctic glaciation** [Kaĭnozoĭskiĭ vulkanizm i istoriia oledeneniia Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.132-139, In Russian. 11 refs.

Results of studies of Cenozoic volcanoclasts, found on the Pacific Ocean portion of Antarctica between latitudes 90 W and 160 E, are presented. The general composition, accumulation and genesis of hyaloclastic layers are studied and conclusions derived concerning the subglacial character of the hyaloclasts. Geochronological data on subglacial volcanites show that the onset of antarctic glaciation, in the studied area, could have taken place in Oligocene or at an even earlier period.

E-29424

Znachko-IAvorskiĭ, G.A., **Major Upper Pleistocene and Holocene paleogeographic features of coastal East Antarctica as shown by marine geological evidence** [Osnovnye cherty paleogeografii pribrezhnoĭ chasti Vostochnoĭ Antarktidy v verkhnem pleĭstotsene i golotsene po dannym morskikh geologicheskikh issledovaniĭ], *Antarktika; doklady komissii,* 1980 No.19, p.140-145, In Russian. 15 refs.

Stratigraphy of the upper bottom sediments in the coastal part of the Indian and partly Atlantic sectors of the antarctic ocean is documented on the basis of comprehensive studies of 150 cores. Indications of sedimentation conditions, dynamics of the ice cover and variations of ocean level during relatively cooler and warmer epochs of Late Pleistocene and Holocene are discussed.

E-29425

Kolobov, D.D., **Relief and glaciation of the southern portion of Prince Charles Mountains** [Rel'ef i oledenenie IUzhnoĭ chasti gor Prins-Charl'z], *Antarktika; doklady komissii,* 1980 No.19, p.146-151, In Russian. 9 refs.

A morphological outline of Prince Charles Mountains, consisting of three basic types of relief—bare, glacial and periglacial—is presented. The history of their formation in preglacial and glacial era is discussed. Particular attention is paid to the evolution of glaciation in the mountain region.

E-29426

Golovanov, N.P., Mikhaĭlov, V.M., Shuliatin, O.G., **First diagnostic stromatolites from Antarctica and their biostratigraphic significance** [Pervye diagnostiruemye stromatolity Antarktidy i ikh biostratigraficheskoe znachenie], *Antarktika; doklady komissii,* 1980 No.19, p.152-159, In Russian. 9 refs.

Data from the first study of diagnostic stromatolites in Antarctica are presented. Stratigraphic cross-sections of metasedimentary layers from Shackleton Range, where organic sediments were found, are shown. Two new kinds of isolated stromatolites, *Collumnacollenia schekltoni* Golovanov and *Planocollina vegeneri* Golovanov F.N., are described. The growth rate of these layers of metasedimentary rock is determined. Comparison of stromatolitic complexes from Gondwanaland continents and those from Antarctica permits to date the development of the layers to Upper Proterozoic.

E-29427

Berliant, A.M., Vasil'eva, T.F., Suetova, I.A., **Spatial relationship of antarctic glacier and rock reliefs** [Prostranstvennye sootnosheniia lednikovogo i korennogo rel'efa Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.160-166, In Russian. 9 refs.

Based on detailed cartographic analyses and calculations of sliding correlation coefficients, and construction of correlation charts, the spatial relationship of subglacial rock relief and that of the ice cover of Antarctica is discussed. Shown are areas of direct, positive relationships; areas of inverse, negative relationships; and transitional areas. Although the visco-plastic properties of ice cause the ice cover to have a generally elliptical profile, the bedrock characteristics are clearly defined in the ice cover relief.

E-29446

Siddiquie, H.N., Hashimi, N.H., **Sedimentology of the sea bed sediments from the Astrid Ridge, Princess Astrid Coast, Queen Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.114-122, 21 refs.

Seabed sediments from the Astrid Ridge range from silty clay to sandy silt. The terrigenous component ranges from 72 to 95% and the Feldspar/Quartz ratio from 0.54 to 2.7. The Scanning Electron Microscopy of quartz shows that the grains near the coast are sharp angular with conchoidal fractures while the grains away from the coast show V-shaped depressions and rounded edges. The angularity reflects the mechanical disintegration and transport by glaciers and ice sheets. The grains were subsequently locked up in ice which possibly led to the formation of V-shaped depressions later covered by deposition. Feldspar/Quartz ratio indicates glacial aridity in the area and the predominance of plagioclases a gneissic schistose source, i.e. the onshore Pre-Cambrians, to the south. The predominant clay minerals are illite (73 to 91%), and chlorite (8 to 26%) which are typical of antarctic sediments. Traces of smectite may represent derivation from Tertiary outcrops on the seabed, volcanic rocks in Antarctica or even recent volcanic activity. (Auth.)

E-29447

Vohra, C.P., **Rock samples collected from the Oasis Mountain region, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.123-129.

Four rock samples from the outcrops of western part of the Oasis Mountain in the vicinity of the *Dakshin Gangotri* station and three rock fragments from the bottom sediments from a depth of 1700 m were studied. The megascopic and microscopic studies revealed that the four rock samples are (i) hypersthene and garnet bearing gneiss (ii) garnetiferous granitoid gneiss (iii) biotite granite and (iv) amphibolite. The rock fragments are of (i) granoditoritic gneiss and (ii) sillimanite bearing granulite. This rock suite is similar to that of peninsular India and is thus related to the pre-drift positions of India and Antarctica. (Auth.)

E-29449

Divakara Rao, V., Govil, P.K., Balram, V., **Geochemistry of metapelite from *Dakshin Gangotri*,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.136-137, 2 refs.

Geochemical studies of the metapelite collected from *Dakshin Gangotri* indicate similarities to the metapelites of the Napier Complex, Enderby Land, Antarctica, and khondalites of the Eastern Ghats of India. Megascopically, the sample is garnetiferous, quartzofelspathic rock of granulite facies metamorphism, containing predominantly quartz, plagioclase feldspar and garnet.

E-29452

Murali, A.V., Krishnamoorthy, K.R., Pichamuthu, C.S., **Petrochemical studies of the rock sample from *Dakshin Gangotri,* Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.153-160, 21 refs.

Petrography, major, minor and trace element studies (including REE) have been carried out on a rock sample from *Dakshin Gangotri.* The study shows that the rock is composed dominantly of plagioclase, quartz, garnet and biotite with minor amounts of microcline (with perthetic intergrowths), hypersthene, magnetite and accessory apatite and zircon grains. The initial hypidiomorphic granular texture of the rock is affected by subsequent dynamic metamorphism. Based on petrographic and chemical data the rock is identified as felsic charnockite (enderbite) with superimposed effects of later dynamic metamorphism which is discussed in detail. (Auth.)

E-29453

Siddiquie, H.N., Bhattacharya, G.C., Pathak, M.C., Qasim, S.Z., **Indira Mount—an underwater mountain in the antarctic ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.161-165, 4 refs.

A major topographic high on the seabed at 53 deg 39.79 S and 47 deg 55.82 E was discovered during the First Indian Expedition to Antarctica and named "Indira Mount". The mount rises from a depth of about 4500 m to about 1200 m and has a number of peaks. One of these peaks rises to within 880 m of the sea surface. The width of the mount at the base appears to be about 185 km and, at the summit, about 134 km. The mount is associated with a composite magnetic anomaly of the order of 1000 gammas. The multiple peaks and high magnetic anomalies indicate that the mount is largely composed of volcanic rocks and that the pile of lava did not reach the surface. Magnetic data indicate heterogeny in the magnetic property of the mount perhaps due to more than one episode of volcanic activity. (Auth.)

E-29454

Siddiquie, H.N., Gopala Rao, D., Ramana, M.V., **Geomorphologic, seismic and magnetic study of the Astrid Ridge, Dronning Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.166-181, 8 refs.

Astrid ridge rising from a depth of about 4000 m to 1000 m is a prominent feature on the continental margin of Dronning Maud Land. The ridge was studied by six E-W and one N-S tracks comprising 458 lkm of echosounding, 405 lkm of seismic profiling and 452 lkm of magnetics. The seismic profiles of the ridge show top transparent or layered sediments (50 ms to 0.4 s) underlain by a prominent reflector (50 to 100 ms) and the acoustic basement between 0.4 to 0.6 s. The sediments dip away from the crest of the ridge to the flanks. The magnetic data indicate that the basement in the area occurs at a depth of 3.0 to 3.4 km. The seismic profiles indicate that the NNE-SSW trending scarps on the eastern flanks represent faults which affect only the younger sediments and are not reflected in the magnetics and thus are not deeper structures. The major NNE-SSW trending fracture reported by earlier workers is not conspicuous in the area and perhaps occurs further to the east. The NW-NNW to SE-SSE trending narrow valleys are grabens where the basement and associated sediments have been faulted down. The grabens are marked by a series of magnetic anomalies of about 100 to 400 nannotesla superimposed over the peak of a broad high amplitude anomaly which indicates an uplift of the magnetic basement and appears to be a deep crustal feature. The graben appears to be a major tectonic feature of the area and marks a change in the trend of the ridge at about 68 S Lat. (Auth.)

E-29464

Vavra, C.L., **Provenance and alteration of the Triassic Fremouw and Falla formations, central Transantarctic Mountains, Antarctica,** Columbus, Ohio State University, 1982, 178p., University Microfilms order No.83-00370, Ph.D. thesis. Refs. p.175-178.

The Fremouw and Falla formations were deposited in a foreland basin that formed in Latest Permian-Early Triassic time between the Gondwanian orogenic belt and the Antarctic craton. The Fremouw Formation records an influx of volcanic material from the direction of the Gondwanian orogen. The Falla Formation records an increase in the amount of air-fall volcanic material upward in the sequence. Post-depositional alterations in the Fremouw and Falla formations including grain dissolution, grain destruction and replacement and formation of clay, silica and zeolite cements resulted from Triassic-Jurassic diagenesis during sediment accumulation in the foreland basin and later zeolite-facies alteration associated with emplacement of Jurassic diabase during the initial phases of rifting of Gondwana. Coal rank data suggest that away from local effects of the diabase intrusions temperatures may have been as low as 130 to 160 C, whereas stratigraphic evidence suggests maximum pressures of about 750 bars, a figure based on the estimated maximum depth of burial of the Fremouw Formation of about 3 km. Mineral and chemical patterns suggest that significant mass transfer of Na, Ca and Si occurred in the sandstone during alteration, and that authigenic mineral assemblages were controlled by the interaction of a variety of factors including parent material composition, fluid chemistry, permeability and temperature. (Auth. mod.)

E-29467

McSween, H.Y., Jr., **SNC meteorites: are they Martian rocks,** *Geology*, Jan. 1984 12(1), p.3-6, Refs. p.5-6.

SNC (shergottite, nakhlite, chassignite) achondrites are similar in many respects to terrestrial basaltic and ultramafic rocks. Several independent geochemical and petrological characteristics suggest that they formed on Mars. These include young (1.3 b.y.) crystallization ages, evidence for a magmatic history too complex for an asteroid, possibly of garnet in the source region, calculations of the magnitude of the gravity field necessary for crystal accumulation by settling, presence of trapped gases similar to the Martian atmosphere, and other features consistent with what is known about Mars. However, the dynamical difficulties of ejecting meteorites from planetary surfaces are formidable. Meteorites from the Allan Hills discoveries are included in the data. (Auth. mod.)

E-29480

Valle, R.A. del, Fourcade, N.H., Medina, F.A., **Preliminary interpretation of the K/Ar ages and chemical analyses of volcanic rocks and dikes from Foca nunataks, Antarctica** [Interpretación preliminar de las edades K/Ar y de los análisis químicos de las rocas volcánicas y de los diques de los nunataks Foca, Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.287, 13p., In Spanish with English, French and German summaries. 6 refs.

The rocks outcropping in Foca Nunataks conform a volcanic association integrated by olivine basalts with alkaline affinities and they can be correlated with the James Ross Group. The rocks of this volcanic association originated during a volcanic cycle which comprises two phases; the oldest dates from the Pliocene and the modern one could be assigned to the Pleistocene-Recent. The chemistry of the rocks varies from the alkaline field, in which the mafic rocks of the group are included, to the siliceous rocks which move towards the tholeiitic field as the volcanic process develops. The volcanism is associated with a deep traction zone in the earth's crust which was active from the Pliocene to the Recent. (Auth.)

E-29482

Díaz, M.T., **Paleomagnetic significance of the Foca nunataks** [Significado paleomagnético de los nunataks Foca], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.295, 11p., In Spanish with English, French and German summaries. 7 refs.

Results of paleomagnetic analysis of seven samples corresponding to basaltic dikes, the polarity of which is normal, are given. On the basis of this paleomagnetic study, the conclusion is drawn that the dikes from which the samples were taken correspond to different effusive cycles, which agrees with geological studies. Taking into consideration the polarity and the radiometric age obtained, an Olduvai magnetic age is suggested for the more recent cycle. (Auth.)

E-29484

Nuñez, J.H., Vilas, J.F., Díaz, T., **Paleomagnetic study with sedimentary rocks from James Ross Island** [Paleomagnetismo con rocas sedimentarias de la isla James Ross, Antártida Argentina], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.302, 10p., In Spanish with English, French and German summaries. 9 refs.

Results of a palaeomagnetic study carried out with five samples of sedimentites from James Ross Island (64 S - 58 W) are presented. Four of these samples belong to Lower Kotic Point formation and the remainder to Hidden Lake formation. Taking into consideration the age assigned to the rocks by palaeontological studies, and according to the values obtained through the analysis of the residual magnetism, the four samples collected at Lower Kotick Point are situated at the Aptian Andean limit while the specimen corresponding to Hidden Lake formation is of Campanian age. The five samples were subjected to tests of magnetic stability by means of progressive warming carried out in stages; this permitted the isolation of the stable residual magnetism (S.R.M.). On the basis of the S.R.M. the corresponding virtual geomagnetic poles (V.G.P.) were obtained. It was observed that the V.G.P. defined in this manner are situated at a distance of about 35 deg from the palaeomagnetic poles of the Andean Intrusive Series (for the Late Cretaceous); this fact could be due to cortical faultings and/or displacements after the genesis of the formations. (Auth.)

E-29489

Robinson, P.H., Elston, D.P., Rieck, H.J., **Drilling in eastern Taylor Valley, Antarctica, 1982-83: some preliminary results,** *Polar record,* Jan. 1984 22(136), p.73-78, 10 refs.

Initial results from a programme of drilling in eastern Taylor Valley, Ross Dependency, Antarctica, in 1982-83 show lithological correlations with earlier drilling work in the same area. A preliminary interpretation suggests that drift deposits represent at least two glacial episodes, probably Ross I and pre-Ross I, separated by periods of proglacial sandur development and lake sedimentation. Further drilling is planned for 1983-84. (Auth.)

E-29491

Wiśniewski, E., **Bunger Oasis: the largest ice-free area in the Antarctic,** *Terra,* 1983 95(3), p.178-187, 17 refs.

The largest of the Antarctic ice-free areas, called oases, is the Bunger Oasis which measures 952 sq km, sea bays included. The oasis is a rocky and hilly area including numerous lakes. It is subject to an intensive physical degradation and wind action. This ice-free area, surrounded by ice on every side, derives its formation first of all from the ice-sheet ground relief and climate conditions. The ice-sheet which once covered the oasis left behind it only till in bedrock depressions, and erratic material. Conspicuous glacial forms represented by ice-cored moraines are to be found only on the marginal belt of the ice-sheet and glaciers. (Auth.)

E-29509

Christians, O., Leinemann, M., **Migration of fluoride from the shell into the muscle flesh of frozen antarctic krill *(Euphausia superba* Dana) in dependence of storage temperature and time** [Über die Fluoridwanderung aus den Schalen in das Muskelfleisch bei gefriergelagertem antarktischen Krill *(Euphausia superba* Dana) in Abhängigkeit von der Lagertemperatur und -zeit], *Archiv für Fischereiwissenschaft,* July 1983 34(1), p.87-95, In German with English summary. 13 refs.

The immediate onset of fluoride migration from the shell into the muscle flesh of the dead krill is not interrupted by a frozen storage period. The intensity of migration depends mainly on the conditions in the frozen storage state: the temperature, the time spent in the frozen state and the kind of preparation of the krill. Only at a temperature of -30 C to -40 C did the fluoride content remain within acceptable limits. Already at -20 C the fluoride content rose considerably. By previously separating the body fluids by the centrifugal process, the migration of fluoride during the frozen storage period can be reduced. Immediate steaming of the freshly caught krill is an effective process for reducing the extent of fluoride enrichment in the muscle flesh. After thawing, fluoride enrichment took place in all cases but to a smaller extent in steamed krill.

E-29514

Stäblein, G., **Formation of slopes, hillsides, and walls. Observations in the Antarctic Peninsula region** [Formung von Hängen, Halden und Wänden. Beobachtungen im Bereich der Antarktischen Halbinsel], *Akademie der Wissenschaften, Göttingen. Abhandlungen. Mathematisch-physikalische Klasse. Third series,* 1983 No.35, Mesoformen des Reliefs im heutigen Periglazialraum. Bericht über ein Symposium (Mesoforms of relief in present periglacial areas. Report on a symposium). Edited by H. Poser and E. Schunke, p.160-170, In German. 29 refs.

A brief background of research done on slopes of various types is given for the northern Antarctic Peninsula and the South Shetland Islands. The different forms are described and typical characteristics are pointed out as observed during a traverse through the region to the stations occupied by the various nations. Photos of the periglacial slopes, ice and rock cliffs, ice foot, rocky ridges and beaches augment the text.

E-29517

Oliver, R.L., ed, James, P.R., ed, Jago, J.B., ed, International Symposium on Antarctic Earth Sciences, 4th, 1982, **Antarctic earth science,** Cambridge University Press, 1983, 697p., Numerous refs. For selected papers see 38-2616 through 38-2626, or B-29595, C-29601, C-29602, E-29518 through E-29643 (with gaps), F-29568, F-29594, F-29603, F-29607, F-29633, I-29606, J-29589, J-29592, J-29611, J-29617, and L-29522 through L-29632 (with gaps).

DLC QE350.A57 1983

The volume is composed of 173 papers, in complete or abstract form, presented at the Symposium in Adelaide, South Australia in August 1982. The papers are grouped under fifteen topics including, among others, the Precambrian East Antarctic Craton, Beacon Supergroup, Marine geology, Antarctic resources, Glacial geology, Plate tectonics, and the Subantarctic Islands. The entire symposium is dedicated to the memory of Sir Douglas Mawson and an abstract of the second Mawson Lecture, delivered by Professor D.H. Green, is included in the front matter. Also included are a brief account of Mawson's scientific life and antarctic accomplishments; a presentation "Mawson the Man." by Sir Mark Oliphant; and a review of the International Polar Years, the IGY, and SCAR by Dr. P.G. Law.

E-29518

James, P.R., Tingey, R.J., **Precambrian geological evolution of the east antarctic metamorphic shield—a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.5-10, 53 refs.

DLC QE350.A57 1983

Modern geochronological data indicate that the East Antarctic metamorphic shield is composed of a number of Archaean cores preserved among larger areas of younger, mainly Proterozoic age, metamorphic rocks. Rocks that are definitely older than 3000 Ma are rare and a pre 3000 Ma history has only been revealed for Enderby Land's Napier Complex. High grade metamorphism and associated tectonism at about 2500 Ma has been documented from the Napier Complex, Prince Charles Mountains and Vestfold Hills. After 2500 Ma the Archaean blocks responded to stress by brittle/semibrittle deformation and mafic dyke swarms were emplaced. Evidence for the 2000-1700 Ma episode of crustal evolution—widely recognized in other southern continents—is confined to sparse geochronological data from the southern Prince Charles Mountains and Terre Adelie/King George V Land areas but there is abundant evidence of metamorphic and tectonic activity between 1300 and 900 Ma. Granulite facies metamorphic rocks, commonly accompanied by syntectonic granitoids and charnockites were formed in this interval; they are exposed in the Prince Charles Mountains area in a belt about 600 km wide which continues west through Enderby Land into Dronning Maud Land. East of the Prince Charles Mountains 1300-900 Ma metamorphic rocks probably occur in the Mirny-Denman Glacier area and in Wilkes Land. Thermal activity at about 500 Ma reset mineral isotopic systems over wide areas of the East Antarctic shield and is locally manifested by granitoid intrusives but does not appear to have been accompanied by folding. It is coeval with the Ross Orogeny in the Transantarctic Mountains and the "Pan African event" in Africa. (Auth. mod.)

E-29519

Black, L.P., James, P.R., **Geological history of the Archaean Napier Complex of Enderby Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.11-15, 22 refs.

DLC QE350.A57 1983

Isotopic dating, controlled by structural and geochemical studies, reveals a long complex geological history. Initial acid igneous crustal formation at 3700-3800 Ma was followed by a sequence of felsic and mafic igneous rocks and metasediments. Intense regional strain (D1) accompanied by granulite-facies metamorphism and granitoid emplacement, rotated into parallelism pre-existing discordances and produced a recumbent gneissic pile at about 3070 Ma. A subsequent ductile deformation (D2) under granulite-facies conditions, and which possibly occurred at about 2900 Ma, was also characterized by tight asymmetric folding, although axial plane foliation was not produced. Cratonisation occurred after a third ductile deformation (D3) (2450-2500 Ma) produced upright non-cylindrical folds under lower grade metamorphism. D3 generally produced no more than weak schistosity. Development of strong D3 schistosity in the Casey Bay area was accompanied by the resetting of Rb-Sr isochrons over at least a cubic metre. Napier Complex monazite and zircon lost Pb during intense granulite-facies tectonism at 1000 Ma in the adjacent Rayner Complex. Post-D3 brittle fractures localized tholeiite dykes at 2350 Ma and 1190 Ma, minor pegmatites at 520 Ma, and a minor alkaline dyke at 484 Ma. (Auth.)

E-29520

Sandiford, M., Wilson, C.J.L., **Geology of the Fyfe Hills-Khmara Bay region, Enderby Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.16-19, 33 refs.

DLC QE350.A57 1983

The gneisses of the Fyfe Hills form part of the Archaean Napier Complex. They are composed predominantly of supracrustal rocks forming the "Layered Series", but also include a component of probable intrusive origin forming the "Massive Series". Both series have been affected by four phases of deformation and multiple metamorphic and intrusive episodes. The available isotopic data are used to constrain the age of each of these events. F1 folds and associated structures indicate intense flattening during prograde granulite facies metamorphism. These folds are of unknown age but are thought to have formed during an episode of continuous metamorphism culminating with the development of 2500 Ma old F2 folds. Tholeiitic dykes are thought to correspond to a suite of similar dykes in neighboring regions dated at 2400 Ma and indicate temperatures (M2) of 650-750 C at pressures similar to M1. The final deformation phase (D4) occurred during the excavation of the gneissic pile. The effects of D4 are restricted to retrograde zones that exhibit a wide range of amphibolite facies mineral assemblages (M3), indicating progressive, near isothermal, decompression. The initiation of the shear zones may have been coeval with the 1000 Ma Rayner event in nearby crystalline blocks. Tectonism ceased with the intrusion of Early Palaeozoic pegmatites, and before the intrusion of rare mafic alkaline dykes which have been dated at 490 Ma elsewhere in Enderby Land. (Auth. mod.)

E-29521

Ellis, D.J., **Napier and Rayner Complexes of Enderby Land, Antarctica—contrasting styles of metamorphism and tectonism,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.20-24, 25 refs.

DLC QE350.A57 1983

This paper reviews work on the Napier Complex and presents new data and interpretation for the Rayner Complex. Mineral reactions following the peak conditions of metamorphism of the Napier Complex record the cooling of these granulites to lower temperature at depth. This "near isobaric cooling path" reflects stable tectonic conditions. The Archaean crust was essentially cratonized after the final phase of metamorphism and deformation at ca 2500 Ma. The ca 1000 Ma Rayner Complex represents a major period of hydration, metamorphism and deformation of the margin of the Napier Complex. The P-T path deduced for this reworking is one of "near isothermal uplift" and reflects a fundamental change in tectonic evolution of the craton from being in isostatic equilibrium with the underlying mantle in the Archaean to vertical tectonic movement in the Proterozoic. (Auth.)

E-29523

Hiroi, Y., Shiraishi, K., Nakai, Y., Kano, T., Yoshikura, S., **Geology and petrology of Prince Olav Coast, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.32-35, 27 refs.

DLC QE350.A57 1983

The main rock types exposed in the Prince Olav Coast are amphibolite, biotite-hornblende gneiss, garnet-biotite gneiss, and granitic gneiss. The last is most abundant as migmatitic rocks containing xenoliths and schlieren. This gneissic and migmatitic complex has been deformed into a NW-SE trending fold system and cut by small masses of granite and pegmatite. Mylonite zones are found locally, where slightly metamorphosed basaltic rocks occur as discordant masses. Sillimanite + K-feldspar association is present throughout the coast. Metastable kyanite usually occurs as inclusions in garnet and plagioclase in most of the sillimanite-bearing rocks. The Prince Olav Coast is divided into two metamorphic zones A and B. The lower grade zone A to the east is characterized by staurolite and Ca-poor amphiboles. The higher grade zone B to the west differs from zone A by a pleonaste + garnet + aluminium silicates association, the breakdown product of staurolite, and the occurrence of orthopyroxene. Thus, the metamorphic grade of the Prince Olav Coast ranges from upper amphibolite (zone A) to lower granulite facies (zone B). The relation between zones A and B is explained by a gradual increase in metamorphic grade from east to west during a single event, probably 1000 Ma ago. (Auth. mod.)

E-29524

Yoshida, M., Kizaki, K., **Tectonic situation of Lutzow-Holm Bay in East Antarctica and its significance in Gondwanaland,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.36-39, 43 refs.

DLC QE350.A57 1983

Three age groups ranging from about 500 to 2000 Ma have been distinguished in the Lutzow-Holm Bay region as reflecting distinctive tectonic-metamorphic events. Similar age groups are recognized elsewhere in east Antarctica and in other Gondwanian regions. 2000 Ma ages in East Antarctica occur as sporadic relict ages in the predominant 1000 Ma age belt. 1000 Ma ages can be traced as a zone from Antarctica to other Gondwanian continents. 500 Ma ages are extensively developed along almost all the boundary areas of the Gondwanian continents except at the Antarctica-Australia boundary. The similarity of the tectonic-metamorphic belt, including the Lutzow-Holm Bay region, to the northern part of the Irumide Belt of southern Africa is pointed out. The Napier zone of Enderby Land and the Indian granulite-charnockite belt may be an Archaean mobile belt. The Peninsular Gneiss of Dharwar and the granitic rocks of the Southern Prince Charles Mountains are regarded as Archaean cratonic nuclei. (Auth.)

E-29525

Grew, E.S., **Sapphirine-garnet and associated parageneses in Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.40-43, 22 refs.

DLC QE350.A57 1983

In the Schirmacher Hills, Queen Maud Land, sapphirine-biotite-garnet granulites (with corundum-plagioclase or sillimanite-cordierite) form two lenses up to 1 m thick in polymetamorphic granulite and amphibolite facies gneisses. During later metamorphism, andalusite formed in sillimanite-garnet gneiss. The sapphirine-granulites have low SiO2 and high Al2O3, MgO and FeO contents and high MgO/FeO ratios. Temperatures and pressures for the appearance of the sapphirine-garnet assemblage in the granulite facies at Schirmacher Hills are estimated to be 750 to 800 C and 5 to 8 kb. K sub D is about 3.5 for coexisting sapphirine and garnet from the Tula and Scott Mountains, Enderby Land (Napier Complex). K sub D's of the Schirmacher Hills sapphirine-garnet pairs are somewhat higher. Orthopyroxene does not occur in stable association with corundum in either the Napier Complex or the Schirmacher Hills, whereas the assemblage garnet-sapphirine-sillimanite is found in both areas. The orthopyroxene-corundum assemblage may be stable only in very dry rocks at lithostatic pressures above the kyanite-sillimanite univariant curve, well above the metamorphic pressures to which the Napier Complex and Schirmacher Hills rocks were subjected. (Auth.)

E-29526

Yoshida, M., Suzuki, M., Shirahata, H., Kojima, H., Kizaki, K., **Review of the tectonic and metamorphic history of the Lutzow-Holm Bay region, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.44-47, 26 refs.

DLC QE350.A57 1983

Recent studies of the tectonic and metamorphic history of the Lützow-Holm Bay region are critically reviewed and summarized as follows: The earliest tectono-metamorphic episode was a high pressure granulite facies metamorphism probably associated with early recumbent and later isoclinal folding about axes parallel to the present coast lines. A single Pb-Pb isochron age of 1900 Ma is thought to date this event. A subsequent event involved intermediate pressure granulite facies metamorphism and possible but as yet unidentified folding. It is thought to be dated by Rb-Sr isochron ages of 1100 Ma. The third tectono-metamorphic event involved east-west open to close folding and upper amphibolite facies metamorphism. The oldest K-Ar age of 560 Ma is considered to provide a minimum age for this. The fourth event consisted of gentle north-south folding and faulting, syntectonic granitoid intrusion and local low amphibolite facies metamorphism and is thought to be dated by averaged Pb isotope ages of 470 Ma and a Rb-Sr isochron age of 458 Ma. Greenschist facies or slightly lower grade metamorphism occurred subsequently, probably during the latest phase of the fourth event. The fifth event involved fracturing under the influence of a stress field with a north-south maximum extensional axis. It may have occurred during the Jurassic with the stress perhaps reflecting Gondwanaland disruption. (Auth.)

E-29527

Shiraishi, K., Asami, M., Ohta, Y., **Geology and petrology of the Yamato Mountains,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.50-53, 10 refs.

DLC QE350.A57 1983

The basement of the Yamato Mountains consists of high grade metamorphic, syenitic and granitic rocks. Geologic and petrologic observations have led to a two-fold subdivision of the metamorphic rocks: older granulite facies rocks such as two-pyroxene biotite gneiss and associated two-pyroxene amphibolite, orthopyroxene biotite gneiss and calc-silicate gneiss, and younger amphibolite facies rocks such as granitic gneiss, biotite amphibolite and migmatitic gneiss. The contact between the granitic gneiss, and a syenitic rock which is genetically related to the two-pyroxene biotite gneiss, seems to be tectonic. Two-pyroxene phase relations and two-pyroxene geothermometry suggest P-T conditions during the granulite facies metamorphism were generally uniform not only among the two-pyroxene-bearing metamorphic rocks but also between these metamorphic rocks and the two-pyroxene syenite. Probable temperatures around 800 C are indicated. The syenite intrusion is considered to be a plutonic climax of the metamophism. The younger amphibolite facies metamorphism is characterized by widespread granite and pegmatite intrusion. This activity might correspond to the 500 Ma intrusion of granite and pegmatite which is widely known in east Antarctica, but the age of the older granulite facies metamorphism remains unknown. (Auth.)

E-29528

Shirahata, H., **Lead isotopic composition in metamorphic rocks from Skarvsnes, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.55-58, 22 refs.

DLC QE350.A57 1983

Bulk chemical and lead isotopic compositions were analyzed for pyroxene gneiss, garnet-biotite gneiss, K-feldspar porphyroblastic gneiss and garnet bearing granitic gneiss, all of which belong to the crystalline basement exposed largely in the Skarvsnes area. Garnet-biotite gneiss is in harmony with pyroxene gneiss in Pb isotope characteristics, though it is closely related to K-feldspar porphyroblastic gneiss in mineral assemblages and bulk chemical characteristic as well as in field relations. The garnet-biotite gneiss is attributed to formation by intermediate pressure granulite facies metamorphism with Rb-Sr age of 1100 Ma. A two stage lead evolution model indicates that the pyroxene gneiss may have formed by high grade granulite facies metamorphism or by mafic igneous activity as old as 1900 Ma. The heterogeneity in Pb isotope systematics of the garnet bearing granitic gneiss implies that the lead has originated from various sialic sources and has not achieved a thorough mixing throughout the later metamorphism. This metamorphic history would be comparable with the sequence of metamorphic events recognized in Lützow-Holm Bay and adjacent regions. (Auth.)

E-29529

Barton, J.M., Jr., Copperthwaite, Y.E., **Sr-isotopic studies of some intrusive rocks in the Ahlmann Ridge and Annandagstoppane, western Queen Maud Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.59-62, 9 refs.

DLC QE350.A57 1983

Rb-Sr whole rock isotopic studies of five suites of mafic igneous rocks from western Queen Maud Land yield ages of about 770 Ma, 1000 Ma, 1430 Ma and 1800 Ma. The ages suggest that igneous activity occurred here intermittently over most of the Proterozoic. These units are also characterized by having high initial 87Sr/86Sr ratios, the significance of which is unclear. (Auth.)

E-29530

Oliver, R.L., Cooper, J.A., Truelove, A.J., **Petrology and zircon geochronology of Herring Island and Commonwealth Bay and evidence for Gondwana reconstruction,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.64-68, 32 refs.

DLC QE350.A57 1983

Approximately 1400 Ma metasediments and metavolcanics at Herring Island have been deformed three times and metamorphosed at 850-900 C and 6-7 kb about 1275 Ma ago. Zircons from the metasediment retain a record of a 2500 Ma provenance age. At cape Denison a very Late Archaean granodiorite gneiss contains zircon which was slightly disturbed isotopically at about 1600 Ma and much more so in the Palaeozoic. This gneiss can be correlated geochronologically and geologically with the Late Archaean Gneisses of Eyre Peninsula, South Australia, whose eastern limit is sharply defined. The match of continental coastlines based on this correlation shows a close resemblance to earlier computer fits and places Herring Island as a continuation of the acutely aligned Fraser Province lineation opposite Albany rather than Esperance. This does not support the linear fitting of the Antarctic Bowers Trough with Tasmanian troughs of similar ages. (Auth.)

E-29531

Plimer, I.R., Lovering, J.F., **Manganese-rich chemical sediments from Wilkes Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.69-72, 28 refs.

DLC QE350.A57 1983

Three principal facies of chemical sediments have been recognized in a suite of pelitic and felsic metasediments at Clark Peninsula, Wilkes Land which experienced a major metamorphism at 1470 Ma and a later event of retrogression at 1100 Ma. The original age of deposition is unknown but source clastic material derives from sequences of 3000 Ma. A laminated manganese(Mn)-rich chemical metasediment comprising tephroite, normally and reversely zoned garnet, jacobsite, barite and calcite transgressed by late stage ferroan and calcic rhodonite and friedelite represents a sulphate facies. A second facies, probably a temporal or spatial silicate facies equivalent, comprises normal zoned garnet containing magnetite inclusions and a Mn-rich rim, hyalophane with sphene inclusions, barite, rutile, biotite and rare manganoan hedenbergite. Banded iron formation comprising quartz, texturally and compositionally zoned garnet, magnetite, amphibole, K-feldspar, chlorite, fibrolite and pinite represents the most oxidized facies of the chemical sediments. The enclosing quartzofeldspathic metasediments comprise quartz, plagioclase, garnet, amphibole, magnetite, fibrolite and chloritized biotite. The Mn content of garnet is highest in a laminated barite-manganese silicate-rich facies and lower in a hyalophane-Mn silicate-amphibole facies which in turn has more Mn in garnet than the banded iron formation. Garnet from the quartzofeldspathic metasediment has the lowest Mn content. (Auth. mod.)

E-29532

Williams, I.S., Lovering, J.F., **Reassessment of the age of the Windmill Metamorphics, Casey area,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.73-76, 12 refs.

DLC QE350.A57 1983

Ion microprobe analyses of zircons at high mass-resolution show that the age of the protoliths of orthogneisses from the Windmill Metamorphics is not more than approximately 1500 Ma. This is consistent with the age and initial 87-Sr/86-Sr from their whole rock Rb-Sr isochron and with a single Nd model age. The discrepancy probably is due to spectral interferences with 207-Pb not accounted for at a low mass-resolution. A single zircon having an age of approximately 3000 Ma has been observed in an associated paragneiss. (Auth. mod.)

E-29533

Collerson, K.D., Reid, E., Millar, D., McCulloch, M.T., **Lithological and Sr-Nd isotopic relationships in the Vestfold Block: implications for Archaean and Proterozoic crustal evolution in the east Antarctic,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.77-84, 22 refs.

DLC QE350.A57 1983

The structural and metamorphic evolution of the Precambrian Vestfold Block reflects the effects of several periods of granulite facies metamorphism and a complex deformational history which involved a number of periods of folding. The terrain is dominated by E-W striking units of garnetiferous semi-pelitic and pelitic gneiss, banded iron formation, quartzite and marble which are tectonically interleaved with compositionally layered units of grey orthogneiss. From field evidence it is clear that the Mossel gneisses formed from metavolcanic protoliths by the development of incipient trondhjemitic and tonalitic partial melts and by the intrusion of discrete sheets of tonalite and trondhjemite. Cutting this sequence are broad units of medium-to coarse-grained, gabbroic, dioritic, tonalitic, granodioritic and granitic augen gneisses which were emplaced under synkinematic conditions. During the Early and Middle Proterozoic, the Vestfold Block was intruded by several major swarms of dolerite dykes. These are correlated on petrographic, geochemical and isotopic grounds with similar dykes in Enderby Land. Sr and Nd isotopic data indicate that gneisses in the Vestfold Block experienced at least two granulite facies tectonothermal events during the Archaean. South of the Vestfold Block, in the Rauer Islands, gneiss and dyke relationships show the effect of reworking during a Late Proterozoic granulite facies event ca 1100 Ma ago. (Auth.)

E-29534

Parker, A.J., James, P.R., Oliver, R.L., Mielnik, V., **Structure, fabric development and metamorphism in Archaean gneisses of the Vestfold Hills, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.85-90, 16 refs.

DLC QE350.A57 1983

Detailed geological mapping at 1:3000 scale has verified the multiphase deformational history of Archaean granulite facies gneisses in the Vestfold Hills and demonstrated the nature and variation of strain, fabric development and metamorphism in selected areas. Early formed fabrics, preserved as "transposed boudins" in a more highly strained/recrystallized matrix, indicate an early history (D1) of high grade metamorphism, migmatization and probable folding. Concurrent recrystallization, migmatization, emplacement of acid/intermediate orthogneisses, pervasive isoclinal folding and interleaving of meta-igneous and metasedimentary rocks were all a function of the subsequent D2 event (Vestfoldian Orogeny). The preservation of various stages in the development of orthogneiss indicates that at least some of the larger masses formed by partial melting in situ during D2. S2 gneissic layering, E-W trending and north dipping, became the principal regional fabric but was locally modified by north and south dipping shear zones associated with monoclinal folding (D3) and numerous N-S trending mylonite zones (D4m). Pre- and post-D4m basic dykes have been identified and pseudotachylite-veined microfaults represent a later, much more brittle deformation postdating most basic dykes. The prevalence of hypersthene and plagioclase, together with abundant garnet and red brown biotite, reflect medium load and moderate water pressure granulite facies conditions of metamorphic crystallisation. Temperatures calculated from coexisting mineral pairs are 620-804 C. (Auth.)

E-29535

Craddock, C., **East Antarctica-West Antarctica Boundary between the ice shelves: a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.94-97, 24 refs.

DLC QE350.A57 1983

East Antarctica (EA) and West Antarctica (WA) show contrasting Phanerozoic tectonic histories. Important problems in Antarctic tectonics include (1) the nature of the EA-WA boundary, and (2) the tectonic behavior of WA during Cretaceous-Cenozoic time. The Horlick Mountains-Pensacola Mountains-Ellsworth Mountains region is critical to these problems. The Horlick, Thiel and Pensacola Mountains form a segment of the Transantarctic Mountains chain; deformed (except in the Thiel Mountains) and intruded Proterozoic-Lower Palaeozoic strata, recording two orogenies, are overlain unconformably by the Gondwana sequence (Devonian-Jurassic). To the north, tightly folded metasedimentary rocks in the Stewart Hills yield a mica K-Ar age of 508 Ma. Farther north the Hart Hills reveal deformed Palaeozoic(?) metasedimentary rocks and altered gabbros; granite at nearby Pagano Nunatak gives a 176 Ma K-Ar age. The Whitmore Mountains expose two early Mesozoic granites intruding metasedimentary rocks. The Martin, Nash and Pirrit Hills all display deformed metasedimentary rocks cut by felsic intrusives, with the Nash and Pirrit granites of Triassic age. The Ellsworth Mountains contain a thick, folded sedimentary sequence of Cambrian-Permian age. Haag Nunataks consist of gneisses and schist of 1000 Ma age. Two tectonic provinces exist, viz the Transantarctic Mountains (the border of EA) in the south, and the Ellsworth Mountains fold belt (EMFB) to the north. The boundary between them lies north of the Horlick Mountains and probably north of the Hart Hills; its nature is unclear, but it may be a fault. (Auth. mod.)

E-29536

Bradshaw, J.D., Laird, M.G., **Pre-Beacon geology of northern Victoria Land: a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.98-101, 27 refs.

DLC QE350.A57 1983

A review of our knowledge of the bedrock geology of northern Victoria Land, particularly developments since 1972, reveals important discoveries especially in stratigraphy, sedimentology and structural geology. The stratigraphy of the Bowers Supergroup has been clarified and newly discovered faunas establish a Cambrian age for several formations. The bedrock geology of the Anare Mountains has been mapped and a submarine fan origin for the Robertson Bay Group has been proposed. The lithology and structure of parts of the Wilson Group has been established. Despite the progress in description, controversies have developed in respect of regional interpretation. Problems include the validity of the term Ross Supergroup in northern Victoria Land; the character, importance and duration of the Ross Orogeny and the merits of a separate Silurian Borchgrevink Orogeny. Earlier research had emphasized the existence of three subparallel north-west trending belts underlain by wilson Group, Bowers Supergroup and Robertson Bay Group from west to east. Recently it has been suggested that parts of the Wilson Group are metamorphosed Robertson Bay Group. If this can be demonstrated it provides major constraints on models for the geological evolution of northern Victoria Land. (Auth.)

E-29537

Field, B.D., Findlay, R.H., **Sedimentology of the Robertson Bay Group, northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.102-106, 21 refs.

DLC QE350.A57 1983

The Robertson Bay Group is a submarine fan deposit of probable Cambrian age. Most of the sandstone beds are turbidites though fluidized sediment flow deposits and debris flow deposits are also present, particularly in the south. Units of red argillite may be restricted to the southern part of the Group. The sandstone beds occur commonly in either thickening up-sequence or thinning up-sequence units several meters thick. Several subfacies of a submarine fan system are recognized. If the red argillites are pelagic then the Robertson Bay Group in the northeast side of the Millen Range may record an early phase of progradation of part of the fan system. Palaeocurrent direction data indicate sediment transport to the northwest to north. Most of the Group was derived probably from a mainly metamorphic terrain. The trace fossil assemblage suggests a Cambrian rather than Vendian age, but is probably facies controlled as much as age diagnostic. The deformation of the Group, on limited radiometric evidence, may be Early Ordovician. A zone of schists on the northeast side of the Leap Year Fault is possibly older than the Robertson Bay Group and may form the basement to part of the Group, though in the Millen Range the contact is faulted. The extent of the Group southwest of the Leap Year Fault is still uncertain. The correlation of the Morozumi Range hornfelses with the Group is questioned and the similarities of the Robertson Bay Group to the southern part of the Molar Formation are discussed. (Auth.)

E-29538

Findlay, R.H., Field, B.D., **Tectonic significance of deformations affecting the Robertson Bay Group and associated rocks, northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.107-112, 30 refs.

DLC QE350.A57 1983

Low-grade metagreywacke of the Robertson Bay Group and Chlorite Sub-zone III schists in the Millen Range, formerly incorporated in the Robertson Bay Group, are juxtaposed tectonically by a fault, possibly extending on a trend of 340 deg along Lillie Glacier, and form two structural domains. Millen Range schists display a possibly early Vendian, syn-metamorphic nappe-like style of deformation seen neither in the Robertson Bay Group to the northeast nor in the Bowers Supergroup to the southwest. Both domains are folded into generally asymmetric, upright to slightly overturned structures with an axial plane cleavage striking 320 deg. Correlation of folds in both domains is discussed. Orientation of these folds suggests formation in a dextral wrench regime. Orientation of mapped and inferred faults in northern Victoria Land suggests a Riedel Shear pattern in a dextral transcurrent displacement zone. (Auth.)

E-29539

Plummer, C.C., Babcock, R.S., Sheraton, J.W., Adams, C.J.D., Oliver, R.L., **Geology of the Daniels Range, northern Victoria Land, Antarctica: a preliminary report,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.113-117, 6 refs.

DLC QE350.A57 1983

The Daniels Range is underlain by a variety of intimately intermixed plutonic and metamorphic rocks, which are collectively assigned to the Daniels Range Metamorphic and Intrusive Complex. Metamorphic rocks comprise quartzofeldspathic gneisses and pelitic to psammitic schists with minor marble and calc-silicate intercalations. These underwent several episodes of deformation as indicated by multiple folding. During deformation and associated metamorphism, locally pervasive, mostly subconcordant intrusion of granitic veins took place. Subsequent plutonic activity resulted in the emplacement of a variety of granitic rocks. The final episode of magmatic activity was emplacement of granitic dykes. Massive, equigranular granitic plutons (of Granite Harbor type) on the western side of the range were probably also emplaced during this post-tectonic episode. (Auth.)

E-29540

Kleinschmidt, G., **Trends in regional metamorphism and deformation in northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.119-122, 23 refs.

DLC QE350.A57 1983

The Robertson Bay Group of northern Victoria Land shows increases in both metamorphism and deformation from northeast to southwest in the area between Cape Adare and the Bowers Mountains. Metamorphic grade in the area ranges from very low in the east to low in the west, the metamorphic trend being indicated by the appearance of biotite near the western boundary and by an increase in illite crystallinity. In addition there is evidence from recrystallization of quartz in syn- or pretectonic quartz veins. Suturing of quartz grains becomes coarser westward and the threshold of true recrystallization is exceeded only west of the center of the Robertson Bay Group where quartz veins are common parallel to S1. There is also a progressive change in the deformation from open to tight and finally to complicated folds, and by the tightening of two conjugate sets of cleavage. The phenomena are attributed to a single orogenic event. (Auth.)

E-29541

Laird, M.G., Bradshaw, J.D., **New data on the Lower Palaeozoic Bowers Supergroup, northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.123-126, 16 refs.

DLC QE350.A57 1983

The Lower Palaeozoic Bowers Supergroup occupies a 350 km long belt transecting northern Victoria Land from the Oates Coast to the Ross Sea. To the east the sequence is faulted against the Upper Precambrian or Lower Palaeozoic Robertson Bay Group and in the west faulted and unconformable contacts separate it from metamorphic rocks of probable Precambrian age. Some stratigraphic revision is necessary in the light of new data. The Supergroup, which exceeds 10 km in thickness, consists of three previously defined units: Sledgers Group (oldest), Mariner Group and Leap Year Group, the last two separated by an unconformity. The Sledgers Group is at least 3.5 km thick and contains two formations. The Middle Cambrian Glasgow Formation comprises volcanic breccia, conglomerate, pillow lava and vesicular flow rocks of basic and intermediate composition which interfinger with marine clastic sediments of the Molar Formation. The concordantly overlying Mariner Group (Upper Middle Cambrian to Upper Cambrian) comprises at least 2.5 km of fossiliferous sandstone, calcareous mudstone and limestone forming a regressive sequence dominated by shallow and marginal marine environments. It is truncated by the unconformably overlying mainly fluvial Leap Year Group (?Ordovician), which is exposed in two separate belts of contrasting lithologies. The eastern strip consists of at least 4 km (and perhaps more than 7 km) of quartzose sandstone and minor conglomerate (Camp Ridge Quartzite). (Auth. mod.)

E-29542

Cooper, R.A., Jago, J.B., Rowell, A.J., Braddock, P., **Age and correlation of the Cambrian-Ordovician Bowers Supergroup, northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.128-131, 17 refs.

DLC QE357.A57 1983

New evidence bearing on the age and correlation of the Cambrian-Ordovician Bowers Supergroup of northern Victoria Land is outlined. Constraints on the age range of the lower unit, the Sledgers Group, are derived from a variety of fossils including a small assemblage of polymerid trilobites in a limestone clast from conglomerate; an age range within the Middle Cambrian older than the late Middle Cambrian, considerably later than the late Precambrian to Early Cambrian age previously inferred. Similarly, the basaltic volcanism represented by the Glasgow Foundation is now known to be of Middle Cambrian age rather than Vendian to Early Cambrian. The conformably overlying Mariner Group is now well dated by trilobites and ranges from late Middle Cambrian to Late Cambrian in age. The youngest unit, the predominantly fluviatile Leap Year Group, contains a trace fossil assemblage consistent with a Late Cambrian to Ordovician age. The Bowers Supergroup is thought to have formed part of a zone of Cambrian rifting, subsidence, rapid sedimentation and volcanism that extended through Western Tasmania, providing a link between the Antarctic and Australian segments of Gondwanaland in Cambrian time. (Auth.)

E-29543

Grindley, G.W., Oliver, P.J., **Post-Ross Orogeny Cratonization of northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.133-139, 32 refs.

DLC QE357.A57 1983

Following the Late Cambrian-Early Ordovician Ross Orogeny and emplacement of the Granite Harbor Intrusives, northern Victoria Land became part of the east Antarctic craton. Non-marine sedimentation in troughs and grabens, rhyolite (ignimbritic) volcanism and fault-folding indicate a typical "Transitional Tectonic Domain" during the remainder of the Palaeozoic. The following phases of cratonization can be recognized. Phase I: Silurian-Early Devonian: Uplift of the basement metamorphic infrastructure (Wilson Group) and unroofing of S-type Granite Harbor batholiths. Folding of Middle Cambrian-Lower Ordovician sediments and volcanics of the Bowers trough along north-west trends. Phase II: Middle-Late Devonian: Rhyolitic volcanism including massive ignimbrites and minor andesites and dacites (Gallipoli Volcanic Complexes). Penecontemporaneous tilting of volcanics up to 90 deg with uplift of granitic basement and incorporation of granitic breccias and fluvial sediments into a volcano-tectonic depression trending eastnortheast. Intrusion of I-type granitoids (Admiralty Intrusives) and minor geothermal activity. Phase III: Carboniferous-Permian: Uplift of Bowers and Admiralty Mountains and unroofing of Admiralty Intrusives. Deposition of Permian glacigenic sediments followed by Permian and Triassic fluvial sediments (Beacon Supergroup). Phase IV: Jurassic: Subsidence of Rennick Graben and further uplift of Bowers and Admiralty Mountains. Basaltic volcanism and dolerite sill intrusion in intra-continental rift zone. Phase V: early

Cretaceous: Block-faulting and folding of Beacon sequences in the Lanterman Range adjacent to the Bowers Tectonic Zone. Downfaulting of Rennick Graben. (Auth.)

E-29544

Vetter, U., Roland, N.W., Kreuzer, H., Höhndorf, A., Lenz, H., Besang, C., **Geochemistry, petrography, and geochronology of the Cambro-Ordovician and Devonian-Carboniferous granitoids of northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.140-143, 17 refs.

DLC QE357.A57 1983

West of the Rennick Glacier and in the Lanterman Range, flysch-like sediments of the medium to high grade metamorphic Wilson Group and of the low grade Robertson Bay Group are intruded by Cambro-Ordovician Granite Harbor Intrusives. They are represented mainly by biotite or two-mica granites occasionally containing cordierite, and subordinately by hornblende-biotite tonalites. Tentative Rb-Sr whole-rock (WR) isochrons yield dates of 515 to 480 Ma (initial ratios 0.71 to 0.715). The granites and granodiorites show S-type and the tonalites mostly I-type, characteristics. Similar K-Ar ages for hornblende, muscovite and biotite point to a final quick cooling of high-level intrusions. The range from 490 to 467 Ma suggests more than one pulse of intrusion. East of the Rennick Glacier the folded Robertson Bay Group metasediments are intruded by the Devonian-Carboniferous Admiralty Intrusives, which are atectonic and strongly discordant. Petrographically nearly all of them show I-type characteristics. Similar biotite and hornblende K-Ar ages suggest high-level quick cooling. The range of K-Ar mineral ages is 367-354 Ma. Multiple intrusions are assumed. A Rb-Sr WR isochron yields a date of 393 Ma. Xenoliths of magmatic restite and of metasediments of varying metamorphic grade were found in the Admiralty I-type granitoids. Geochemical analyses and Sr initial ratios of 0.71 to 0.72 demonstrate the influence of metasediments on the composition of the granitoids. (Auth.)

E-29546

Skinner, D.N.B., **Geology of Terra Nova Bay,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.150-155, 12 refs.

DLC QE357.A57 1983

Priestley schist is a higher grade along strike equivalent of the Priestley Formation, a pelitic sequence with subordinate meta-greywacke and minor limestone and quartzite. The Snowy Point paragneiss is tightly interfolded with Priestley schist (F2) but has incongruent mesofolds to the F2 structures, belonging to an earlier fold phase (F1). It is thus a probable unconformably older unit. A third relatively weak fold phase (F3) caused only broad open folding. The metasedimentary rocks form a septum between two distinct granitoid associations—the Southern Victoria Land and Terra Nova Batholiths. Because Priestley Formation is syn F2 kinematically intruded by Late Vendian Larsen Granodiorite, Priestley schist and Snowy Point paragneiss are Precambrian, and F2 fold phase, as in southern Victoria Land, is a probable northern extension of the Beardmore Orogeny. None of the units of Terra Nova Batholith described in this paper is post-kinematic. Instead they are pre-F1 pegmatites; pre-F2 gneiss and Canwe Granodiorite; late kinematic (F2?) Russell Granite, Hells Gate Granite, Seaview Granodiorite, Inexpressible Granite, and Abbott Granite; and late kinematic (F3?) Keinath Granite, Corner Tonalite and Dickason Granite. (Auth.)

E-29547

Dahl, P.S., Palmer, D.F., **Petrology and origin of orbicular tonalite from western Taylor Valley, southern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.156-159, 5 refs.

DLC QE357.A57 1983

Orbicular tonalite and associated rocks from western Taylor Valley have been studied by field, petrographic and electron microprobe techniques. Orbicules are biaxially ellipsoidal in shape and typically consist of a diopside-biotite-andesine core surrounded by multiple concentric shells alternately rich in hornblende and plagioclase. Elongate radially-oriented hornblende, plagioclase, and clusters of diopside-biotite are superimposed on the overall concentric structures. The latter clusters give way to hornblende as the tonalite matrix is approached. Microprobe analysis reveals complex mineral-chemical variations from orbicule core to the tonalite matrix, and the bulk composition of the shell region is intermediate relative to compositions of orb core and tonalite matrix. These observations, considered with field evidence, suggest that orbicule shells formed from xenoliths, as a result of incomplete assimilation by and simultaneous chemical exchange with tonalite magma. Chemical exchange occurred by diffusion of components between tonalite magma and partially melted outer parts of xenoliths. Based on calculated bulk chemical analyses, the components Na_2O, Al_2O_3, and SiO_2 are thought to have diffused from the tonalite magma to the melting xenolith, whereas FeO, MgO, CaO, K_2O diffused out from the xenolith to the magma. This mass transfer process is postulated on the basis of orbicules representing an intermediate stage of xenolith assimilation. However, when taken nearly to completion, the process also accounts for the common field occurrence of more-advanced orbicules, which have dominantly plagioclase cores and cafenic shells. (Auth.)

E-29548

Skinner, D.N.B., **Granites and two orogenies of southern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.160-163, 37 refs.

DLC QE357.A57 1983

Mawson's grey biotite granite and younger pink hornblende granite were subsequently renamed the syntectonic Larsen Granodiorite and the post-tectonic Irizar Granite with respect to a single pulse Cambro-Ordovician Ross Orogeny. However, more recently three deformation events (F1, F2, F3) have been identified, with considerable time interval between them. Intrusion of Portal Augen Gneiss and other granitoids occurred between F1 and F2. High grade metamorphism and accompanying anatexis to produce Renegar Mafic Gneisses and intrusion of Buddha Diorite, were early synkinematic to F2 and preceded uprising gneiss domes of Chancellor Orthogneiss. These were followed by a second, late synkinematic F2 high grade metamorphism with further anatexis to produce phases of Larsen Granodiorite, namely Olympus Granite Gneiss with anatectic and migmatitic border facies and magmatic Dias Granite. Rheomorphism or continued injection of Larsen Granodiorite took place during the Early Ordovician third deformation along with intrusion of Theseus and Skelton Granodiorites. High level Crags, Vida and Irizar Granites post dated F3 in the Late Ordovician. F1 remains undated but is Precambrian in age. F1 and F2 are separated by granitoid intrusion, uplift, erosion and volcanism/sedimentation. A zircon U-Pb date on Olympus Granite Gneiss of 588.5 Ma, and a Rb-Sr whole rock isochron of 568 Ma, on Carlyon Granodiorite provide a Vendian order of age for the late second deformation equivalent to the Beardmore Orogeny and imply that Skelton/Koettlitz Groups and pre-Larsen granitoids are Precambrian. The Ross Orogeny is mainly an Ordovician granitoid intrusive thermal event associated with relatively weak tectonism. (Auth.)

E-29549
Borg, S.G., **Petrology and geochemistry of the Queen Maud Batholith, central Transantarctic Mountains, with implications for the Ross Orogeny,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.165-169, 32 refs.
DLC QE357.A57 1983

A suite of 31 Early Palaeozoic intrusives ranging in composition from granite to diorite from the Scott and Leverett Glacier areas represents a nearly continuous, 190 km long cross section. Field relations indicate that these granitoids are related to the Cambro-Ordovician Ross Orogeny. The granitoids form a typical calc-alkaline batholith and new data show that chemical variation across this batholith is similar to chemical variation across the major circum-Pacific batholiths. In this study, the Queen Maud Batholith is examined in terms of the S- and I-type granitoid classification scheme developed in southeastern Australia. Petrographic observations as well as new whole-rock geochemical data indicate that the main portion of the batholith in the middle Scott Glacier area is composed of both I- and S-type plutons whereas granitoids north and east of Leverett Glacier are exclusively I-type. Thus, an S-I boundary appears to be positioned south of the Leverett Glacier, approximately through the Tapley Mountains. It is suggested that the boundary of the Early Palaeozoic Antarctic miogeocline traverses the Scott Glacier near the Tapley Mountains and runs approximately in a northwesterly direction parallel with the axis of the Queen Maud Batholith to the Beardmore Glacier area. Furthermore, it is suggested that this boundary may be continuous with the boundaries inferred in northern Victoria Land and southeastern Australia by the distribution of S- and I-type granitoids. (Auth.)

E-29550
Stump, E., **Type locality of the Ackerman Formation, La Gorce Mountains, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.170-174, 19 refs.
DLC QE350.A57 1983

The Ackerman Formation is herein named for the sequence of alternating clastic and volcanic rocks of Late Precambrian(?) age exposed in the La Gorce Mountains, 86 deg 45 min S, 147W, at the head of Scott Glacier. The type locality and only known occurrence of the Ackerman Formation is on Ackerman Ridge, where a steeply dipping 2000 m section crops out. The formation conformably overlies massive porphyries of the Upper Precambrian Wyatt Formation at the northern end of Ackerman Ridge. The upper portion of the formation contacts the La Gorce Formation along a major high angle fault which has produced a shear zone several hundred meters wide in both formations. The Ackerman Formation is characterised by immature sandstones, grey, purple and green shales or phyllites, and massive, silicic porphyries. Some of the clastic rocks contain a minor fraction of calcareous material. In General, the shales and sandstones are thinly bedded and alternating. Two distinctive sandstone units occur in the formation. Each is massive, 2-3 meters thick, and contains sparse rounded cobbles. In the volcanic porphyries phenocrysts of rounded quartz and highly altered plagioclase and biotite occur in varying amounts. In some specimens chlorite completely replaces mafic phenocrysts, which were originally probably orthopyroxene. The groundmass is recrystallised to such an extent that any original textures which might have been present are obliterated. Evidence suggests emplacement of the volcanic units as both ignimbrites and lavas in a marginal marine environment. The entire Ackerman Formation has been slightly metamorphosed. Incipient cleavage is developed in many of the units, increasing in intensity near the high angle fault at the top of the formation. (Auth.)

E-29551
Pankhurst, R.J., Marsh, P.D., Clarkson, P.D., **Geochronological investigation of the Shackleton Range,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.176-182, 18 refs.
DLC QE350.A57 1983

Rb-Sr radiometric dating has been applied to all major lithological units exposed in the Shackleton Range. This allows the construction of a more complete time scale for the geological evolution of this area than has been previously possible. The oldest rocks identified in the Shackleton Range Metamorphic Complex are high grade ortho- and paragneisses which have disturbed Rb-Sr whole rock systems dating from at least 2,000-2,300 Ma. Two pegmatites from Wedge Ridge have model ages of about 2,700 Ma. A minimum age for the high grade metamorphism of the older part of the basement is given by an isochron of 1,765 Ma for granite gneiss in the Read Mountains. Most of the basement rocks, however, show the effects of strong thermal resetting of the isotope systems in Middle to Late Proterozoic times. The younger part of the metamorphic complex consists of supracrustal greenschist to amphibolite grade gneisses and schists, mostly of sedimentary origin. These show a very strong "Pan-African" imprint at 500-600 Ma. Initial 87 Sr/86 Sr ratios constrain the age of deposition of the sediments to a maximum of about 850 Ma. Thus the main east-west structural trend of the Shackleton Range results from the final Late Cambrian or Ordovician tectonometamorphism and was succeeded by folding about N-S axes in the extreme west of the range and deposition of the Cambro-Ordovician Blaiklock Glacier Group. (Auth.)

E-29552
Hofmann, J., Paech, H.-J., **Tectonics and relationships between structural stages in the Precambrian of the Shackleton Range, western margin of the east antarctic craton,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.183-189, 13 refs.
DLC QE350.A57 1983

In the southern Shackleton Range the Middle to Upper Riphean cover of the East Antarctic Craton overlies probably the oldest parts of the pre-Middle Riphean basement; the cover rocks were subjected to a saxonotype deformation under the influence of block movements in the basement, and to a low-grade metamorphism. In the northeastern Shackleton Range the basement rocks are divided into an older complex (Charpentier Series) and a younger one (Herbert Series), possibly of Middle and early-Upper Proterozoic ages respectively. Sedimentation, fold structures and medium grade regional metamorphism of the Herbert Series were controlled by the previously consolidated high grade metamorphic Charpentier Series which, as a rigid basement unit prevented intensive deformation of the Herbert Series. Simultaneously, the Charpentier Series was subjected to retrograde metamorphism and tectonic reworking. (Auth.)

E-29553
Marsh, P.D., **Late Precambrian and Early Palaeozoic history of the Shackleton Range, Coats Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.190-193, 22 refs.
DLC QE350.A57 1983

Four extensive sequences of metasediments overlie and are interleaved with a Mid-Proterozoic high-grade basement. Two sequences had an active source providing a high proportion of first-cycle sediment. They crop out in the north, at high structural levels and have coarse grained amphibolite facies fabrics cut by retrograde mylonitic fabrics. The metasediments in the south, at lower structural levels, are dominated by more mature sediment and have prograde amphibolite and greenschist facies fabrics. The range is interpreted as a complex of nappes, between high grade terrain to the north and a foreland to the south, brought together during the events which produced the prograde fabric in the metasediments of the south and the retrograde fabric in those of the north and in the basement. Sedimentation and deformation took place within the same time range as in the Beardmore and Ross Orogens. However, the ensialic nature of the Late Precambrian sedimentation, a lack of major plutonism, the present cratonic setting, and the structural trend of the range favour comparison not with these "geosynclinical" orogens of the margin of the East Antarctic craton but with the nearly contemporaneous, intra-Gondwana, "Pan African" mobile belts some of which became the sites of rifting to form the South Atlantic and Indian oceans. (Auth.)

E-29554

Kamenev, E.N., Ivanov, V.L., **Structure and outline of geologic history of the southern Weddell Sea basin,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.194-196, 8 refs.

DLC QE350.A57 1983

The southern Weddell Sea Basin includes parts of the Maudheim Plate, Transantarctic and Ellsworth Mountains fold systems, Antarctic Peninsula fold system and the Weddell Sea Basin proper. In the geologic history of the region there are two major periods recognised: (1) formation of continental crust and (2) formation of sedimentary-volcanic cover. Thick (up to 15 km) sedimentary fill of the Weddell Sea Basin has been forming from the Late Proterozoic to the Cenozoic. (Auth.)

E-29557

Walker, B.C., **Beacon Supergroup of northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.211-214, 10 refs.

DLC QE357.A57 1983

The area between Gair Mesa and the Lanterman Range in northern Victoria Land contains up to 300 m of Permian alluvial plain sediments of the Beacon Supergroup (Takrouna Formation). Scattered outcrops rest unconformably on a basement of metasedimentary and plutonic rocks. The Takrouna Formation is divided into two members. Member A occurs only in the northern part of the area, but Member B covers the whole area. Member A was deposited on a northeast dipping palaeoslope, and Member B was deposited on a west dipping palaeoslope. Seven sedimentary facies occurring as two facies associations are recognised within the Takrouna Formation. Facies association 1, considered to be largely flood-deposited, includes the cross-bedded sandstone, ripple laminated sandstone, massive sandstone and mudstone facies. Facies association 2, deposited in shallow channels between flood events, includes the ripple and parallel laminated fine sandstone, tabular cross-bedded sandstone and coal facies. Member A contains both facies associations, whereas Member B contains only facies association 1. The rivers of Member A flowed from the area of the retreating Permian ice sheet. Then uplift of the mountains to the east of the study area reversed the palaeoslope, and the deposition of Member B followed. (Auth.)

E-29558

Zawiskie, J.M., Collinson, J.W., Hammer, W.R., **Trace fossils of the Permian-Triassic Takrouna Formation, northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.215-220, 35 refs.

DLC QE357.A57 1983

The Takrouna Formation, a sandy braided stream deposit of Permian to Triassic age, contains locally abundant trace fossils. Trace fossils in the channel-form sandstone facies include Aulichnites, Monocraterion, Skolithos and horizontal, backfilled epichinial traces. These trace fossils are interpreted as invertebrate dwelling burrows and deposit-feeding trails. A fine-grained facies, interpreted to be of pond origin, lacks all elements of the channel ichnocoenose and is dominated by *in situ* structures interpreted to be reed-like plants and root mats. Allochthonous organic detritus was probably the main food resource in the Takrouna ecosystem. The association of *Monocraterion* and *Skolithos*-bearing beds is typically more characteristic of marine environments. Some elements of the Takrouna invertebrate fauna may have been brackish-water species that became adapted to life in fluvial channels.

E-29559

Collinson, J.W., Kemp, N.R., **Permian-Triassic sedimentary sequence in northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.221-225, 26 refs.

DLC QE357.A57 1983

Permian-Triassic rocks in northern Victoria Land were deposited by sandy braided streams in a northwest trending basin that paralleled the present location of the Rennick Glacier. The distribution of facies, composition of sandstones, and palaeocurrent data indicate dispersal toward a northerly and westerly direction form a granitic and metamorphic source terrain. The Takrouna Formation is widespread in the central Rennick Glacier area and along the margin of the Polar Plateau. Regionally, the Takrouna Formation overlies a rugged, locally deeply weathered surface of granitic and metamorphic basement rocks. The maximum preserved thickness of the formation, 300 m, occurs in the Freyberg Mountains, but the upper part has been removed by erosion. Along the margin of the Polar Plateau the formation is less than 50 m thick, resting directly on granitic basement and overlain unconformably by Kirkpatrick Basalt (Jurassic). The formation is characterised by coarse to medium grained feldspathic to quartzose sandstone and by lesser amounts of carbonaceous and non-carbonaceous silty mudstone and coal. Isolated pockets of diamictite, some of which are glacigene, occur at the base. Sedimentary sequences are dominated by large-scale trough and planar tabular cross-bedding and closely resemble the Devonian Battery Point sequence of Quebec, which represents a sandy braided stream environment such as that of the South Saskatchewan River in Canada. Coarse grained, less carbonaceous facies east of the Rennick Glacier change to finer grained coal bearing facies to the west, defining the margin and central axis of the basin. (Auth.)

E-29560

Whitby, K.J., Rose, G., McElroy, C.T., **Formational mapping of the Beacon Supergroup type area with special reference to the Weller Coal Measures, south Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.228-232, 5 refs.

DLC QE350.A57 1983

The area mapped was approximately 650 square kilometers. The special problems encountered and the non-standard geological mapping techniques employed in this exercise are discussed. Fifteen separate formations and members including extensive exposures of the Ferrar Dolerite have been shown on the map at a scale of 1:50 000. Of special interest is the occurrence of deformed Metschel Tillite in Beacon and Arena Valleys, apart from previously recorded deformation of strata lower in the sequence in the same region. Type sections of the Altar Mountain Formation (230 m thick), Arena Sandstone (358 m), Brawhm Sandstone Member (41 m) and Farnell Sandstone Member (188 m) were selected and measured. At Kennar Valley a 7 m stratigraphic section of part of the Weller Coal Measures was measured and channel samples were taken from three coal seams; at Mt Fleming a coal seam in close proximity to a basic dyke was sampled. On the basis of petrographic analyses, the very high reflectances indicate the coals to be high rank anthracite; however, the volatile content indicates semi-anthracite. (Auth. mod.)

E-29561

Kyle, P.R., Pankhurst, R.J., Bowman, J.R., **Isotopic and chemical variations in Kirkpatrick Basalt Group rocks from southern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.234-237, 22 refs.

DLC QE350.A57 1983

Samples from fifteen Kirkpatrick Basalt Group lava flows at Gorgon Peak, David Glacier, have been analysed for major and trace elements and strontium and oxygen isotope composition. They show many of the unusual features characteristic of Ferrar Supergroup rocks elsewhere, including relative enrichment of lithophile elements such as Rb and high initial 87-Sr/86-Sr ratios (mostly 0.710-0.712). Analyses of mineral separates and leaching experiments show that post-crystallisation alteration has not significantly affected 87-Sr/86-Sr ratios in the basalts. Delta 18 O values mostly fall in the range + 6 to +8 per ml. Consideration of these data, together with results for a high-MgO sill at Painted Cliffs, Beardmore Glacier, show that if the observed variations are due to mixing between a mantle derived magma and a crustal contaminant then the former was nevertheless characterized by an anomalous initial 87-Sr/86-Sr of >0.709. The petrogenesis of the Ferrar Supergroup probably involves some crustal contamination, however, the main features of the geochemistry are believed to reflect a heterogenous mantle source. (Auth.)

E-29562

Bradshaw, M.A., McCartan, L., **Depositional environment of the Lower Devonian Horlick Formation, Ohio Range,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.238-241, 11 refs.

DLC QE350.A57 1983

The Lower Devonian Horlick Formation is a thin and varied clastic sequence of sandstones and shales that non-conformably overlies Ordovician granitoids. It is in turn overlain disconformably by the Permo-Carboniferous Buckeye Tillite. Exposures along the Ohio Escarpment show rapid variations in thickness of Horlick Formation from 0 to 50 m as a result of pre-Buckeye erosion. Nine lithofacies, repeated several times, are recognized. Most of the sediments and fossils suggest deposition in a shallow marine environment, nearly all shoreface, adjacent to a coastline with fluctuating conditions reflecting minor transgressive and regressive episodes. A Coarsening upward motif in the ripple laminated beds indicates a regressive sequence, while a fining upward motif from channel sands to ripple laminated beds represents the onset of a transgressive phase. The phosphatic bone bed horizons represent periods of greatly reduced sedimentation. The appearance of shelf forms in the *Nuculites* and *Tentaculites* horizons suggests that these beds represent the maxima of transgressive cycles. Connection of the Ohio Range with the Australasian seas is suggested along the Pacific Coast of Gondawana, with convergence of the Subpolar Gyre and Western Boundary Current in the New Zealand region. (Auth. mod.)

E-29563

Rowley, P.D., **Geology and plate tectonic setting of the Orville Coast and eastern Ellsworth Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.245-250, 58 refs.

DLC QE350.A57 1983

Orville Coast and eastern Ellsworth Land are underlain by Middle and Upper Jurassic dark and volcanoclastic shale, siltstone, and sandstone (Latady Formation) and intertongued calc-alkaline silicic to intermediate ash-flow tuff, lava flows, volcanic breccia, and air-fall tuff (Mount Poster Formation). All these rocks were tightly folded and locally thrust faulted with south to southeast vergence, then intruded in Early Cretaceous time by widely spaced calc-alkaline plutons of the Lassiter Coast Intrusive Suite. The rocks of the southern Antarctic Peninsula and eastern Ellsworth Land formed above a plate of Pacific basin lithosphere being subducted beneath what is now the peninsula. The Jurassic rocks accumulated on a magmatic arc and in its marine back-arc basin. The rocks of the Mount Poster Formation were deposited mostly subaerially along the axis of the magmatic arc along the present topographic crest of the southern Antarctic Peninsula. On the southeastern flank of the arc, where the Latady and Mount Poster Formations intertongue, many rocks likewise are continental deposits. Farther southeast, rocks of the Latady Formation are marine; depositional environments changed progressively southeastward from apparent deltaic and other near-shore environments to open shallow-water. The marine rocks are locally rich in invertebrate fossils. The Cretaceous plutons represent the roots of a younger overlapping magmatic arc. (Auth. mod.)

E-29564

Webers, G.F., Craddock, C., Rogers, M.A., Anderson, J.J., **Geology of Pagano Nunatak and the Hart Hills,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.251-255, 10 refs.

DLC QE[illegible].A57 1983

The Pagano Nunatak-Hart Hills area lies near the southern end of a mainly ice-covered rock ridge which extends southward from the Ellsworth Mountains to the Thiel Mountains. This ridge is a key region in understanding the tectonic relationships between East and West Antarctica. Pagano Nunatak is a prominent peak rising about 230 m above the surrounding ice. Almost all bedrock consists of a grey, massive, medium to coarse-grained granite, here called the Pagano Granite. The granite is undeformed, unmetamorphosed, and cut by small aplite dykes. A 40K-40Ar age determination on biotite from the Pagano Granite yielded an apparent age of 175 Ma. The Hart Hills are several low, rounded hills aligned in an east-west direction. The exposed bedrock includes almost equal areas of metasedimentary rocks and cross-cutting quartz gabbro intrusions. The metasedimentary unit, here called the Hart Hills Formation, is exposed in a 396 m stratigraphic section; it consists mainly of quartz-mica phyllites and subarkosic sandstones. No fossils were recovered. (Auth. mod.)

E-29565

Bauer, R.L., **Low-grade metamorphism in the Heritage Range of the Ellsworth Mountains, West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.256-260, 14 refs.

DLC QE350.A57 1983

Mineral assemblages in mafic igneous and volcanoclastic rocks within the Middle to Upper Cambrian Heritage Group indicate these rocks have been recrystallised under pumpellyite-actinolite facies to greenschist facies conditions. Basaltic flows, volcanic breccias, and gabbroic dykes and sills from the Liberty Hills and Springer Peak Formations of the upper Heritage Group contain pumpellyite-actinolite facies assemblages. An observed decrease in the Fe content of pumpellyite in the Heritage Group indicates an increase in metamorphic grade with depth. Such an increase in grade is further indicated by the lack of pumpellyite and the presence of greenschist facies mineral assemblages in the lower Heritage Group. Correlation of pumpellyite-actinolite facies to greenschist facies conditions with depth in the Heritage Group is consistent with a major burial metamorphic event in the Ellsworth Mountains ranging from zeolite facies in the Polarstar Formation (Permian) to greenschist facies in the lower Heritage Group. Prehnite-pumpellyite facies assemblages, not reported from the units between the Heritage Group and the Polarstar Formation, may not have developed due to lack of rocks of appropriate composition or as a result of high CO2 in carbonate rich portions of the section. (Auth. mod.)

E-29566

Webers, G.F., Sporli, K.B., **Palaeontological and stratigraphic investigations in the Ellsworth Mountains, West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.261-264, 4 refs.

DLC QE350.A57 1983

Seventeen fossiliferous localities, ranging in age from Middle Cambrian to Permian, were sampled in the Ellsworth Mountains during the 1979/80 field season. Studies of new trilobite faunas together with stratigraphic and structural field work have permitted a major revision of the lower 7800 m of strata in the Heritage Range of the Ellsworth Mountains. The lowermost stratigraphic unit is the Heritage Group. The formations of the Heritage Group are: Union Glacier Volcanics, Hyde Glacier Formation, the Drake Icefall Formation, the Conglomerate Ridge Formation, and laterally equivalent units: Frazier Ridge Formation, the Springer Peak Formation, and the Liberty Hills Formation. The Heritage Group ranges in age from Middle to Late Cambrian and is overlain by the Late Cambrian Minaret Formation. (Auth. mod.)

E-29567

Yoshida, M., **Structural and metamorphic history of the Ellsworth Mountains, West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.266-269, 12 refs.

DLC QE350.A57 1983

A polyorogenic interpretation of the structural development of the Ellsworth Mountains is critically reviewed. Some new data on fold and cleavage structures in the southern and northwestern parts of the Heritage Range are presented and discussed. The data suggest that there are variations in fold style and trend during one folding episode, but there are also fold superposition relationships. These can be directly observed in the field, and can also be inferred from the timing of cleavages in relation to dykes or veins. In the south the first stage main longitudinal folding and cleavage development occurred before the intrusion of the Heritage altered dolerites which have maximum K-Ar ages of ca 400 Ma (Late Silurian). The second stage produced longitudinal minor kink folds and the third produced transverse minor kink folds, both being associated with local spaced cleavages and affecting the Heritage altered dolerites, and hence are considered to be post Late Silurian. The second and third stages in the south can possibly be correlated respectively with second order longitudinal kink folds and gentle second order transverse folds that occur in the northwest. (Auth.)

E-29569

Bradshaw, J.D., Andrews, P.B., Field, B.D., **Swanson formation and related rocks of Marie Byrd Land and a comparison with the Robertson Bay Group of northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.274-279, 20 refs.

DLC QE350.A57 1983

The Swanson Formation is the oldest unit exposed in the Ford Ranges of Marie Byrd Land; it was folded and metamorphosed in the Middle Ordovician before the intrusion of Late Palaeozoic granitoids. Neither base nor top is exposed but a thickness of several kilometers is likely. The formation is a monotonous quartz-rich metaflysch in which non-graded and graded sandstones, the latter with partial Bouma sequences, alternate with slatey mudstone. Two measured sections totalling 1 km are presented. Palaeocurrent measurements indicate deposition on a surface which dipped to the east but was swept by bottom currents which flowed to the north. Weakly hornfelsed bedded tuffs at Lewisohn Nunatak are distinguished as the Lewisohn Member. They are less deformed than typical Swanson Formation but follow Swanson type rocks concordantly and are correlated with tuffaceous rocks interbedded in the Swanson Formation in the Mackay Mountains 20 km to the north. The name Fosdick metamorphic zone is applied to higher rank Swanson metasediments included in the Fosdick Complex. The latter is unlikely to be older than Middle Ordovician and is not regarded as pre-Swanson Basement. Recent work on the Robertson Bay Group confirms the close sedimentological and compositional similarities. However this is not sufficient ground for considering them to be the same unit. Palaeocurrent patterns are quite different. Their relationship to Devono-Carboniferous granitoids suggests they were in the same orogenic belt and had a similar relationship to Late Palaeozoic plate boundaries. (Auth.)

E-29570

Dalziel, I.W.D., **Evolution of the Scotia Arc: a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.283-288, 54 refs.

DLC QE350.A57 1983

Over the past decade major advances have taken place in our knowledge of the geology and geophysics of the Scotia arc region and our understanding of the evolution of the arc itself. The continental "basement" that was formerly regarded as Precambrian is now known to consist of Palaeozoic, Mesozoic, and possibly even Cenozoic rocks accreted to the South American and Antarctic segments of Gondwanaland as a fore-arc terrain before, during and possibly after breakup, and as the products of early arc magmatism. The Antarctic Peninsula, formerly regarded as essentially a continuation of the entire Andean Cordillera, is now known to be a Mesozoic to Cenozoic magmatic arc that, unlike the southernmost Andes, does not incorporate the suture of a closed marginal basin. Thus one can account for differences in tectonic style around the arc. Recent work on South Georgia and in the South Orkney Islands reinforces the view that the submarine platforms from which they emerge represent fragments of South America and Antarctica that have been transported east relative to their respective parent continents. Marine geophysical studies reveal a complex history of Cenozoic tectonics between the South American and Antarctic Plates. A major puzzle lies in the timing and location of the initiation of a westward dipping subduction zone as now seen in the South Sandwich arc. The original relationship of the Antarctic Peninsula to southern South America remains uncertain. Three possibilities are evaluated. (Auth.)

E-29571

Thomson, M.R.A., Pankhurst, R.J., Clarkson, P.D., **Antarctic Peninsula—a late Mesozoic-Cenozoic arc (review),** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.289-294, 54 refs.

DLC QE350.A57 1983

From at least Early-Middle Jurassic times the Antarctic Peninsula developed as a magmatic arc, related to subduction of Pacific Ocean floor beneath a disintegrating Gondwana supercontinent. The basement to this arc is at least 25 km thick and its exposed parts consist mainly of the deformed metasedimentary rocks and gneisses related to an earlier Late Palaeozoic-Triassic subducted margin. This simple picture is complicated by radiometric dating which suggests that some deformed rocks previously thought to be "basement" accreted in Late Cretaceous times. Enough stratigraphical and facies data now exist to attempt a series of palaeogeographic reconstructions, although these still need to be related geographically to the rest of Gondwana. Geochemical and radiometric studies in the northern

Antarctic Peninsula have revealed a westward migration of the site of magma generation across the edge of the continental crust into oceanic mantle and possibly a northward younging of intrusive activity. The latter may in some measure be related to the progressive northward cessation of subduction along the peninsula. Graham Land appears to be divided into two major tectonic segments of which the southern one is the more deeply eroded. Future work needs to address the problems of possible magmatic variations within Palmer Land, and an assessment of the region's uplift history with a view to producing a unified model for the whole of the Antarctic Peninsula. (Auth.)

E-29572

Askin, R.A., **Tithonian (Uppermost Jurassic)-Barremian (Lower Cretaceous) spores, pollen and microplankton from the South Shetland Islands, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.295-297, 21 refs.

DLC QE350.A57 1983

Fossil spores, pollen and microplankton have been recovered in samples from five localities on Byers Peninsula, Livingston Island, and two localities on President Head, Snow Island. Palynomorph distribution enables subdivision into two broad zones. Assemblage A, represented by samples from the western margin of Byers Peninsula is of Tithonian-Berriasian-?earliest Valanginian age. Assemblage B, represented by samples from the western margin of Byers Peninsula and President Head, is of ?Valanginian-Hauterivian-Barremian age. Similarity of supposed Barremian spore and pollen assemblages of the South Shetlands with those of the Baqueró Formation, southern Argentina, suggest close proximity of the two areas during the Neocomian; while the presence of endemic South Shetland forms suggests environmental differences between the two areas. (Auth.)

E-29573

Crame, J.A., **Cretaceous inoceramid bivavles from Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.298-302, 32 refs.

DLC QE350.A57 1983

Inoceramid bivalves provide a useful method for correlating the Cretaceous sedimentary sequences of Antarctica. In the Lower Cretaceous, the cosmopolitan *I. neocomiensis*, *I. concentricus* and *I. anglicus* groups are particularly useful zone fossils. The *I. ovatus* (Berriasian-Valanginian) and *I. heteropterus* (Hauterivian-Albian?) groups can be used to make circum-Pacific correlations, and *I.* cf. *anomiaeformis* provides a possible link between Hauterivian-Barremian strata of the Scotia Arc and Patagonia. The oldest Upper Cretaceous inoceramids belong to the Turonian *I. lamarcki* group. They are of the succeeding *I. neocaledonicus* group, which may prove to be particularly useful for correlating Senonian sections in Antarctica, Patagonia, Madagascar and New Caledonia. The youngest Antarctic inoceramids are two 'giant' Campanian species. (Auth.)

E-29574

Elliot, D.H., Gracanin, T.M., **Conglomeratic strata of Mesozoic age at Hope Bay, northern Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.303-307, 23 refs.

DLC QE350.A57 1983

Conglomeratic rocks of Mesozoic age are widely but sparsely distributed on the northern Antarctic Peninsula and the South Orkney Islands. At Hope Bay the conglomerates unconformably overlie, but are locally in fault contact with, the Trinity Peninsula Group which constitutes part of the pre-Jurassic Gondwanian basement. The conglomerates and associated sandstones represent sedimentary facies of both mass movements and traction currents. Facies recognised include deposits from debris flows and braided streams, and the succession of facies are interpreted as the evolution of a single fan. The Hope Bay fan is modified by contemporaneous volcanism which is recorded as pyroclastic beds in the middle and upper part of the section. These alluvial fan sediments were probably deposited in a fault bounded basin in the uplifted Gondwanide orogen. The Hope Bay fan is part of a well defined tectonostratigraphic unit that bridges the Gondwanian and Andean events. (Auth.)

E-29575

Laudon, T.S., Thomson, M.R.A., Williams, P.L., Milliken, K.L., Rowley, P.D., Boyles, J.M., **Jurassic Latady Formation, southern Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.308-314, 31 refs.

DLC QE350.A57 1983

The Jurassic Latady Formation, a thick sequence of sandstone, siltstone, shale, and conglomerate with locally interbedded volcanic rocks, and sparse thin coal and limestone, occurs in an area that extends more than 600 km along the Weddell Sea coast of the southern Antarctic Peninsula, and inland as much as 200 km. Most Latady sandstone is lithic sandstone, some is arkosic, and a little is quartzitic. Maximum thickness of the Latady Formation is probably several kilometres; neither the top nor the base of the unit has been definitely identified. Palaeontologic evidence indicates that most of the Latady is of Late Jurassic (Kimmeridgian to Tithonian) age; Middle Jurassic beds occur in the Behrendt Mountains. Most of the Latady was deposited in shallow marine shelf environments. Terrestrial and near shore marine environments are represented in the interior of the southern Antarctic Peninsula. Deeper water, open marine environments are represented in a few areas near the present coast. The Latady Formation was deposited in a back-arc basin located on the southeastern side of a magmatic arc located along the axis and western side of the Antarctic Peninsula. This magmatic arc was built on continental lithosphere during south-southeastward subduction of the southern Pacific plate. Volcanic rocks of the Mount Poster Formation which make up the arc were the principal source of detritus of the Latady Formation. Metamorphic rocks of the pre-Jurassic(?) basement of the arc were an important source of detritus, and plutonic rocks and sedimentary rocks were minor sources. (Auth.)

E-29576

Thomson, M.R.A., **Late Jurassic ammonites from the Orville Coast, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.315-319, 24 refs.

DLC QE350.A57 1983

Jurassic ammonite faunas in the Latady Formation of the Orville Coast are almost entirely composed of perisphinctids and range from Middle to Late Jurassic. The Late Jurassic forms are reviewed and found to be mainly Tithonian, although the possibility that some may range as low as the Kimmeridgian cannot be ruled out. Existing fossil collections were made during the course of a reconnaissance geological survey and, until more detailed field work is done, approximate ages can be assigned on an area basis only. Rocks in the Bean Peaks-Hauberg Mountains-Peterson Hills are the oldest and mainly Early Tithonian to early Late Tithonian, those of the Wilkins Mountains area are early Late Tithonian, and the youngest are those of Cape Zumberge (latest Tithonian). (Auth.)

E-29577

Woodburne, M.O., Zinsmeister, W.J., **New marsupial from Seymour Island, Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.320-322, 15 refs.

DLC QE350.A57 1983

Remains of the first fossil land mammal yet found in Antarctica were discovered during the austral summer of 1982. The fossils were recovered from the Upper Eocene La Meseta Formation on Seymour Island, in the northeastern tip of the Antarctic Peninsula. The specimens comprise two jaw fragments and two isolated teeth of an animal that belongs to the extinct South American marsupial family Polydolopidae, and appear to be most closely related to the genus Polydolops. Examination of the specimens indicates that at least three individuals were preserved in these deposits, which suggests that a sizable parent population of polydolopids was present on Seymour Island about 40 million years ago. The fossils were recovered from a unit of light grey, finely laminated, crossbedded and loosely consolidated arkosic sandstone, located approximately 510 m stratigraphically above the base of the La Meseta Formation. The marsupial fossils were associated with numerous extinct marine molluscs, sand crab-like arthropods, bones of teleost fish, penguins, and whales, and numerous sharks teeth. Faunal and sedimentological data suggest that the marsupial bearing strata represent a former beach deposit. The discovery of marsupials in Antarctica supports theories that predicted their past presence there and strengthens the proposal that Antarctica served as an intermediate pathway to land mammal dispersal between South America and Australia in the Late Cretaceous or early Cenozoic. (Auth.)

E-29578

Farquharson, G.W., **Evolution of Late Mesozoic sedimentary basins in the northern Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.323-327, 24 refs.

DLC QE350.A57 1983

In Late Jurassic times the Antarctic Peninsula was probably located towards the "southwestern" margin of an anoxic basin that covered the incipient South Atlantic and adjacent areas. Although a volcanic arc was present in the area at that time, it lacked appreciable subaerial relief and alternating radiolaria rich mudstones and ash fall tuffs (Nordenskjöld Formation) accumulated over an extensive area. Uplift in earliest Cretaceous times led to emergence of the magmatic arc and the development of local, fault-bounded alluvial basins which became sites for the accumulation of debris derived from a basement terrain of deformed metasediments. Conglomerates and sandstones were deposited on alluvial fans, whilst finer material accumulated as floodplain and lucustrine deposits. The later phases of terrestrial sedimentation were contemporaneous with and finally gave way to a major episode of calc-alkaline volcanism. To the east of the emergent arc in Cretaceous and Early Tertiary times lay an ensialic back arc basin in which accumulated an extensive and thick (about 5 km) pile of arc derived debris. Petrographic studies indicate that the main phase of arc construction lasted from the Early Cretaceous to Palaeocene and was followed by a period of dissection. (Auth.)

E-29579

Thomson, M.R.A., Pankhurst, R.J., **Age of post-Gondwanian calc-alkaline volcanism in the Antarctic Peninsula region,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.328-333, 42 refs.

DLC QE350.A57 1983

After the Gondwanian Orogeny, the Antarctic Peninsula became the site of a magmatic arc that formed in response to subduction of the Pacific beneath a disintegrating Gondwana supercontinent. It was once implied that the calc-alkaline volcanic rocks (Antarctic Peninsula Volcanic Group (APVG)), which resulted from this magmatism, were erupted almost entirely in the Late Jurassic and therefore provided a useful stratigraphic marker unit. However, a review of fossil and sedimentologic data from volcanoclastic parts of the sequence and associated fore- and back-arc deposits, together with radiometric ages from lavas and dykes, clearly indicate that volcanism was active in the area almost continuously from Early Jurassic to Tertiary times (ca 180-60 Ma). Although lithologic and chemical variations have been observed in the volcanic rocks, it is uncertain if any of these have stratigraphic significance. Without fossil or radiometric evidence, no exposure of APVG rocks can be dated more precisely than Jurassic-Tertiary. (Auth.)

E-29580

González Ferrán, O., **Seal Nunataks: an active volcanic group on the Larsen Ice Shelf, West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.334-337, 21 refs.

DLC QE350.A57 1983

Recent investigations carried out in January 1982 confirm that the Seal Nunataks Group (comprising 16 volcanic cones emerging from the Larsen Ice Shelf) represents an area of active volcanism in Antarctica. Two of these cones, Murdoch Volcano (368 m) and Dallman Volcano (210 m), show active fumaroles and abundant steam at their craters, respectively. Wide areas of the Larsen Ice shelf around the volcanoes are covered by pyroclastic material, indicating the occurrence of some relatively recent eruption. The absence of a snow and ice cover from the majority of the cones and the abundant melting which has formed small lakes and rivers on the Larsen Ice Shelf, is evidence for present day existence of a high thermal flow in the area. These volcanic centers morphologically correspond to a series of cones consisting of pyroclastics and lava flows, some of them with well conserved cones which would represent the summit of major volcanoes rooted on the continental shelf, some 300 to 500 meters below the Ice Shelf level on the northwestern sector of the Weddell Sea. These volcanic centers show a clear, N60-70 W striking structural control. Chemically and petrographically they correspond to alkali olivine basalt, indicating volcanism associated with extensive tectonic processes. (Auth.)

E-29581

Hamer, R.D., **Petrogenetic aspects of the Jurassic-Early Cretaceous volcanism, northernmost Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.338-342, 26 refs.

DLC QE350.A57 1983

A major phase of calc-alkaline volcanism recorded on Trinity Peninsula forms part of the episodic, subduction-related magmatism of the Antarctic Peninsula. Recent studies indicate that although initiated in the Jurassic, much of this activity took place in the Early Cretaceous. These rocks are coeval with the oldest volcanic sequences described from the South Shetland Islands, where the overall character of the volcanism is more basic and shows features typical of rocks transitional between island-arc tholeiites and normal calc-alkaline regimes. New whole-rock data confirm the trend of increasing acidity away from the trench. Garnet bearing xenoliths in volcanic rocks on Trinity Peninsula suggest that this volcanism was ensialic and that crustal thickness of 25 km may have already been in existence prior to the Jurassic. In addition, high initial 87/86Sr ratios (0.709) obtained from Early Cretaceous volcanic rocks indicate that the Trinity Peninsula magmas were, at least in part, the product of interaction with sialic crust. Initial 87/86Sr ratios from the South Shetland Islands are generally lower (0.703-0.704) and no garnet bearing xenoliths have been reported. The extent of fractionation, contamination and mixing of the rising magma prior to eruption is not yet known, although such processes might be expected to have played a greater role in the development of the volcanic rocks on Trinity Peninsula, where the crust was thicker. (Auth.)

E-29582

González Ferrán, O., **Larsen Rift: an active extension fracture in West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.344-346, 25 refs.

DLC QE350.A57 1983

South of the Antarctic Peninsula a zone of alkali basaltic volcanism, Pleistocene to Recent in age, is still active in some centers represented by Paulet Is., Coley Cone, Seal Nunataks and Argo Point. The volcanism delineates an extension zone 400 km long running parallel to the Antarctic Peninsula, 70-80 km southeast of it: the Larsen Rift. It is one member of a double rift system, being parallel to the Bransfield Rift, located about 200 km to the northwest, on the other side of the Antarctic Peninsula. Seal Nunataks could represent the intersection with a N60-70 W striking fracture, directly related to the Hero Fracture Zone, which extends northwest of the Shetland trench axis. This fracture affects the continental block of the Peninsula and represents the southern termination of the Bransfield Rift. This Pleistocene to Recent double rift system started as a consequence of the extensive tectonic processes which followed after the ending of subduction activity in the Shetland area during the Miocene. As a conclusion it may be said that at present, the northern part of the Antarctic Peninsula, with its rift system, would be subjected to a "fan type" expansion. (Auth.)

E-29583

Elliot, D.H., **Mid-Mesozoic to Mid-Cenozoic active plate margin of the Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.347-351, 29 refs.

DLC QE350.A57 1983

Early to Mid-Mesozoic uplift of the Gondwana plate margin was accompanied by block faulting and deposition of orogenic fanglomerates. The fanglomerates overlap spatially and temporally with the magmatic arc that developed on the Gondwanian orogen. Magmatic activity was initiated by Mid-Jurassic time and continued into the Tertiary. Upper Jurassic to Mid-Cretaceous fore-arc basin sequences with a volcanic component occur along the Pacific margin. The volcanogenic back-arc sequence along the Weddell flank of the southern Peninsula is Middle to Late Jurassic in age; in contrast, the sequence in the James Ross Island region is Cretaceous to Early Tertiary. Arc-related deformation was confined to the southern half of the Peninsula and is Early Cretaceous in age in southern Palmer Land, whereas tectonism in the northern Peninsula was confined to major uplift which spanned at least Mid-Cretaceous to Mid-Tertiary time. A major difference in plate tectonic setting is implied. The magmatic history suggests at least intermittent subduction of oceanic crust beneath the Peninsula throughout this time span however, a major break in the subduction history occurred at the time of formation of the Aluk Ridge; relations to sea-floor anomaly patterns can be inferred only for the Cenozoic. (Auth.)

E-29584

Smellie, J.L., **Geochemical overview of subduction-related igneous activity in the South Shetland Islands, Lesser Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.352-356, 16 refs.

DLC QE350.A57 1983

The South Shetland Islands have been situated on a consuming plate margin for at least 200 Ma but igneous activity probably did not become established there until the earliest Cretaceous. The lavas show some features of island-arc tholeiites but are mainly basalts, basaltic andesites and silica-poor andesites of monotonous low-K, high-alumina calc-alkaline type. Entirely calc-alkaline intermediate magmas were also developed on King George Island during the Early Tertiary. At least five major rock groups have been identified stratigraphically. Despite considerable similarity in major oxides, they differ in dispersed element concentrations. Two groups are shown to be heterogeneous, each containing two chemically distinct members *Sensu lato*. All the groups can be related by variable partial melting and/or fractionation of plagioclase, pyroxene, olivine, titaniferous magnetite and apatite. The plutonic intrusions are a calc-alkaline suite of mainly gabbro, tonalite and granodiorite with element abundances and inter-element ratios closely comparable with the associated, probably cogenetic lavas. They invariably crop out in areas of volcanic rocks altered under conditions ranging up to the prehnite-pumpellyite facies. The alteration probably occurred in fissure-controlled multipass geothermal systems set up above the rising cooling plutons, resulting in leaching and re-precipitation of Si, K, Rb, Ba, Ca and Fe. (Auth.)

E-29585

Moyes, A.B., Hamer, R.D., **Contrasting origins and implications of garnet in rocks of the Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.358-362, 43 refs.

DLC QE350.A57 1983

Almandine rich garnet occurs as an accessory mineral in many outcrops on the Antarctic Peninsula. It is found as discrete crystals or in enclaves, within peraluminous calc-alkaline volcanic and plutonic rocks, associated volcaniclastic and terrestrial sediments and in metamorphic rocks. Comparison with published experimental data shows that differences in petrography and chemistry have genetic implications for the origin of garnet and host rock. Two different types of garnet can be distinguished—primary igneous and metamorphic. Igneous garnet is found in both peraluminous volcanic and plutonic rocks—a high Fe, low Mn variety typical of volcanic rocks is considered a high pressure (5-7 kb) remnant phase and a high Fe, high Mn variety typical of plutonic rocks is a lower pressure (possible as low as 1 kb) mineral. Metamorphic garnet is distinguished by a higher Mg content, although chemistry varies with host rock and metamorphic grade. Garnet xenocrysts within the calc-alkaline volcanic rocks indicate temperatures of 690-800 C and pressures possibly up to 10 kb, and represent accidental inclusions of lower crust. It would appear that a considerable thickness of continental crust (at least 25 km) was already developed prior to the initiation of the Mesozoic magmatic arc. (Auth.)

E-29586

Hervé, F., Godoy, E., Davidson, J., **Blueschist relic clinopyroxenes of Smith Island (South Shetland Islands): their composition, origin and some tectonic implications,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.363-366, 20 refs.

DLC QE350.A57 1983

Clinopyroxene porphyrocrysts thought to be relics, of igneous origin, were found in mafic blueschists of the pre-Jurassic(?) Smith Island metamorphic complex. Although the blueschists do not preserve mesoscopic relic igneous textures, the composition of the clinopyroxenes (low Ti-augites) and the nature of the associated lithologies, which include possibly metalliferous metacherts, support the idea that the high P-low T metamorphics of the South Shetland Islands are at least in part composed of accreted subalkaline ocean floor or island arc basalts. The geochemical data preclude an origin involving an eclogitic or other high grade metamorphic rock. Because the moderate to high P-low T metamorphic complex of the Southern Coastal Domain in Chile shares common features, a more or less continuous belt of oceanic lithologies accreted to the margin of Gondwana during the Late Palaeozoic and/or Early Mesozoic can be postulated. (Auth.)

E-29587

Pankhurst, R.J., **Rb-Sr constraints on the ages of basement rocks of the Antarctic Peninsula,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.367-371, 21 refs.

DLC QE350.A57 1983

Rb-Sr studies have been carried out on samples of the various rock groups in the Antarctic Peninsula region which have been suggested as basement into which the igneous rocks of the Mesozoic-Tertiary arc were emplaced. A Permo-Carboniferous age is confirmed for the Hope Bay Formation of the Trinity Peninsula Group and correlation with other greywacke deposits in the South Shetland and South Orkney Islands seems reasonable. The amphibolite terrain of the Scotia metamorphic complex could be derived from similar material but the blueschist/greenschist terrain seems to be largely of Cretaceous age implying continued ocean floor sediment accretion from pre-Gondwanian times. The orthogneisses of the Neny Fjord area and northeastern Palmer Land are the products of Late Triassic or earliest Jurassic magmatism. The migmatitic gneisses of eastern Graham Land provide the clearest evidence of pre-arc basement, with metamorphism in Early Triassic times overprinting a previous crustal history which may extend back into the latest Precambrian. (Auth.)

E-29588

Frakes, L.A., **Problems in antarctic marine geology: a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.375-378, 22 refs.

DLC QE350.A57 1983

The slow pace of scientific research in Antarctica has meant that insufficient information is available on climatology and meteorology to permit reliable modelling of past climates from sparse geologic data. Interpretations of information from oxygen isotopes, from sedimentologic data and from palaeogeographic and palaeo-oceanographic information are suspect when the distributions of land and sea and the palaeoclimatic state were greatly different from the present. This particularly is evident with regard to the Eocene and Oligocene glaciations of Antarctica, which apparently are not reflected in oxygen isotope curves or in the sea level record. The evidence of the earliest Antarctic glaciations is restricted, thus far, to West Antarctica and it is therefore postulated that large Miocene build-ups of ice suggested in isotope studies reflect construction of East Antarctic ice. Large moisture sources (warm oceanic surface waters) existed in the southern Pacific in the Palaeocene-Eocene, contributing to formation of West Antarctic ice sheets. Such sources did not exist in the southern Atlantic and Indian Oceans until the advent of North Atlantic Deep Water in the Middle Miocene; it was at this time that the East Antarctic ice sheets originated. (Auth.)

E-29591

Anderson, J.B., Brake, C., Domack, E.W., Myers, N., Singer, J., **Sedimentary dynamics of the antarctic continental shelf,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.387-389, 10 refs.

DLC QE350.A57 1983

Relict basal tills and glacial marine sediments of the Antarctic continental shelf underlie surficial sediments with only minor glacial components. Basal tills, which were deposited by lodgement processes, occur on the inner continental shelf of the Weddell Sea, Ross Sea and off the George V coast. These deposits grade seaward into diamictons, of glacial marine origin, on the outer continental shelf. The ice-rafted component of relict sediments decreases markedly a short distance beyond the shelf break. This abrupt facies boundary reflects the dominance of basal debris transport, and deposition of this debris landward of the calving line. Hence, significant glacial sedimentation on the continental shelf occurs only when the ice sheet is grounded there. Presently, glacial sedimentation on the continental shelf is minimal; siliceous biogenic muds and oozes are the most abundant surficial sediments on the continental shelf, exclusive of the Weddell Sea where terrigenous muds occur. These sediments contain only minor ice-rafted components. Shallow portions of the shelf are floored by residual sands and gravels which reflect intense bottom current activity. Most of the shelf is deeper than 400 m, so it is below the reach of these currents. Fine sediments entrained by bottom currents have little chance of escaping the continental shelf. This is because the continental shelf is highly irregular, glacial troughs almost completely encircle the East Antarctic continent, and the continental shelf typically slopes toward the continent, not offshore. (Auth.)

E-29593

Truswell, E.M., **Geological implications of recycled palynomorphs in continental shelf sediments around Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.394-399, 34 refs.

DLC QE350.A57 1983

On three areas of the East Antarctic continental shelf, concentrations of recycled palynomorphs in dredge samples collected during the Australasian Antarctic Expedition of 1911-14 are sufficiently high to suggest sedimentary sequences are being eroded nearby. Near the Shackleton Ice Shelf, palynomorphs of Permian, Late Jurassic to Early Cretaceous, and Late Cretaceous to Early Tertiary age occur. On the outer shelf offshore from Cape Carr, Early Cretaceous to Early Tertiary sequences are suggested; the same age span distinguishes sediments west of the Mertz Glacier. On an Australia/Antarctica reconstruction, the last two areas match southern Australian basins where thick Cretaceous rift valley sequences occur. Quantitative analyses of sediments from the Ross Sea, collected by USNS *Eltanin,* show a dense concentration of Late Cretaceous and Tertiary palynomorphs in the southeast, coinciding with discharge from ice streams D and E. This may reflect a provenance in the Byrd subglacial basin. Dinoflagellates suggest marine conditions in this area between East and West Antarctica in the Eocene. (Auth.)

E-29596

Rowley, P.D., Ford, A.B., Williams, P.L., Pride, D.E., **Metallogenic provinces of Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.414-419, 62 refs.

DLC QE350.A57 1983

Compilation of information on occurrences of metallic minerals known in Antarctica permits crude definition of metallogenic provinces. No occurrence currently known on the continent is economically exploitable today. The oldest metallogenic province is the East Antarctica iron metallogenic province, which consists of two parts: an iron-formation subprovince extending from Enderby Land to Wilkes Land and containing widespread jaspilite deposits; and an iron oxide vein subprovince in Queen Maud Land containing veins of magnetite and possible related sulphide minerals that may have been remobilised by hydrothermal processes acting on older iron source terrains. Possible future discoveries in this province are additional syngenetic iron-formation, but gold in mafic volcanic rocks, gold-uranium in conglomerate, and nickel, chromium, and related metals in ultramafic intrusions also may occur in the craton. The Transantarctic metallogenic province consists of two parts: a Ross subprovince containing copper, other base metals and precious metals associated with silicic intrusions; and a Ferrar subprovince that contains iron, copper, cobalt, chromium, nickel, and platinum in stratiform mafic bodies such as the

Dufek intrusion. Targets for future discoveries include faulted rocks near the contacts of Lower Palaeozoic intrusive rocks as well as sills of the Middle Jurassic Ferrar Group. The Andean metallogenic province consists of two parts: a broad copper subprovince containing porphyry copper deposits and hydrothermal veins; and a minor narrow iron subprovince of magmatic iron minerals that overlaps the western part of the copper subprovince. (Auth. mod.)

E-29597

Kameneva, G.I., Grikurov, G.E., **Metallogenic reconnaissance of antarctic major structural provinces,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.420-422, 16 refs.

DLC QE350.A57 1983

Three major metallogenic provinces are recognised in Antarctica related to three principal structural provinces. The Gondwanian metallogenic province encompasses the East Antarctic craton; the Circum-Pacific province is associated with the West Antarctic geosynclinal belt, and the "Atlantic" (sub)provinces are related to extensive areas of peri- and epicratonic tectonism. Available data afford but a preliminary assessment of mineral potential of the continent, based to a larger extent on global analogies than on direct Antarctic evidence. The most promising for hard mineral concentrations are the Andean orogen of the West Antarctic geosynclinal belt, and some zones of epicratonic tectonism. The hydrocarbon potential of vast Antarctic sedimentary basins is dubious and requires further investigation. At present only two occurrences of least valuable resources—iron and coal—may be ranked as deposits. Despite favourable structural and minerogenic factors apparently present in some regions, the prospects of discovering major ore and hydrocarbon reserves in Antarctica are highly uncertain. (Auth.)

E-29598

Behrendt, J.C., **Geophysical and geological studies relevant to assessment of the petroleum resources of Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.423-428, 38 refs.

DLC QE350.A57 1983

There are no known petroleum resources in Antarctica and information is lacking to make reliable estimates of undiscovered resources. Only giant (about 70 million tons or 0.5 billion barrels) or more probably supergiant (about 700 million tons or 5 billion barrels) fields would be reasonable to consider as economical in the next few decades in the hostile Antarctic environment. Consideration of locations of known giant oil fields in the world does not make Antarctica appear very prospective. The tectonic history of Antarctica subsequent to the Gondwanaland breakup suggests that West Antarctica is the most likely area to contain petroleum resources although East Antarctica cannot be excluded. Probably only the continental margins (possibly including ice shelf areas) bordering the Ross, Amundsen, Bellingshausen and Weddell Seas and Amery Shelf Ice will be exploitable with present or soon to be developed technology because of the several kilometer thick moving grounded ice sheet covering the rest of Antarctica. Geophysical data are sparse but do suggest the presence of several kilometers of unmetamorphosed sedimentary rock (possibly Cretaceous and Tertiary age) beneath the Ross, Weddell and Bellingshausen margins. Shows of gas in the DSDP holes, although provocative, cannot be considered evidence of any hydrocarbon resources. (Auth. mod.)

E-29599

Dreschhoff, G.A.M., Zeller, E.J., Kropp, W.-R., **Radiometric survey in northern Victoria Land,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.429-432, 5 refs.

DLC QE350.A57 1983

During the 1981/82 field season an airborne radiometric survey was conducted in northern Victoria Land from a remote field camp in the Freyberg Mountains and a total of 3260 km of flight line was completed. The survey included igneous, metamorphic, and sedimentary rocks ranging in age from Precambrian to Late Cenozoic. Gamma-ray data from this region indicate a higher degree of short range variability than has been observed in any of the other four areas surveyed in Antarctica. This undoubtedly reflects the high level of geologic complexity in northern Victoria Land. No extensive concentrations of radioactive elements were detected at any location but the area shows substantial evidence for geochemical mobility of uranium at a number of sites. Since both depletions and enrichments are apparently present the entire region should be viewed as a possible source area for sedimentary deposits in adjacent parts of the continent. Specifically, adjoining areas to the south and west of northern Victoria Land should be examined for potential sedimentary concentrations. (Auth.)

E-29600

Ford, A.B., Mays, R.E., Haffty, J., Fabbi, B.P., **Reconnaissance of minor metal abundances and possible resources of the Dufek Intrusion, Pensacola Mountains,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.433-436, 33 refs.

DLC QE350.A57 1983

The Jurassic layered mafic Dufek intrusion (>50,000 sq km area, 8-9? km thick) may rival in size South Africa's Bushveld Complex and is far larger than any other known complex of this type. Many similarities with other mafic layered intrusions that contain economically important magmatic deposits make occurrence of resources likely, although none is yet identified in this mostly ice-covered body. Resources such as Cr, Ni, Cu, V, Ti and particularly Pt-group elements (PGE) known in other complexes are considered to be "speculative resources" of the Dufek intrusion, in which PGE would have greatest potential for possible utility. Analyses for these elements show a greater abundance of Cu, V, Ti and PGE in the upper compared with the lower exposed parts of the body, suggesting an enrichment with differentiation. In the lower section (Dufek Massif), Pt, Pd and Rh contents have been found to be only near or below limits of determination. Petrologic comparisons suggest that the chief PGE zone of interest in the Bushveld Complex (Merensky Reef) would occupy an analogous position in the upper part of the concealed section of the Dufek intrusion. (Auth. mod.)

E-29604

Taylor, K.S., Faure, G., **Provenance dates of feldspar in glacial deposits, southern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.453-456, 27 refs.

DLC QE350.A57 1983

Glacial deposits on Mt. Fleming and at Prospect Mesa in Wright Valley contain feldspar that was dated by the Rb-Sr method. Two feldspar size fractions extracted from the till on Mt. Fleming and two feldspar fractions from Beacon clasts in the till fit a line on the Rb-Sr isochron diagram whose slope corresponds to an age of 238 Ma. The colinearity of these data is probably caused by the presence of varying amounts of alteration products in the feldspar and indicates that most of the feldspar in the till originated from the Beacon sandstone. The fine fractions of feldspar from the Mt. Fleming till were treated to remove these weathering products and they fit a line with a slope corresponding to a date of 499 Ma which is indistinguishable from age of the granitic basement rocks in southern Victoria Land. Grain-size fractions of feldspar from the Jason glaciomarine diamicton at Prospect Mesa form an isochron whose slope yields a date of 480 Ma which is similar to the ages of the igneous rocks in Wright Valley. Size fractions of feldspar and one "magnetic" fraction from the Peleus till, situated above the Jason, define a mixing line whose slope is equivalent to a provenance date of 762 Ma. The provenance date therefore suggests that the Peleus till may contain a component of feldspar derived from the Precambrian Shield of East Antarctica. (Auth.)

E-29605

Bockheim, J.G., **Use of soils in studying the behaviour of the McMurdo Ice Dome,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.457-460, 25 refs.

DLC QE350.A57 1983

A chronosequence of soils was examined on a series of four sets of moraines adjacent to the Wright Upper Glacier at Mt. Fleming. Soil development and surface boulder weathering features increase with distance from the glacier. The soils on an ice-cored lateral moraine, an intermediate lateral moraine and an outer lateral moraine are similar to soils on alpine I, II and III moraines in Wright Valley which are <1.7 to 3.1 ka, about 100 to 140 ka and 2.00 to 3.33 Ma in age, respectively. The soil on ground moraine beyond the lateral moraines is similar to that on the Pliocene or Late Miocene age Peleus till in central Wright Valley. The presence of strongly developed soils on alpine III drift only 40 m from the present margin of the Wright Upper Glacier suggests that it has not thickened substantially in the past 2.00 to 3.33 Ma. (Auth.)

E-29608

Pickard, J., Adamson, D.A., **Perennially frozen lakes at glacier/rock margins, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.470-472, 7 refs.

DLC QE350.A57 1983

Perennially frozen lakes partially bounded by icesheet or glacier ice occur widely in Antarctica. In the Framnes Mountains at least 15 lakes from 0.02 to 0.85 sq km in area occur in embayments on the lee sides of nunataks. In the Vestfold Hills three lakes up to 2.00 sq km in area occur along the margin of the Sorsdal Glacier and low bedrock hills. Lake ice, from three to more than five metres thick differs morphologically from glacier ice and caps water up to 120 m deep. Large boulders "float" on the surface of some lakes because they do not melt through. Lakes form when meltwater at the rock margin becomes deeper than the winter freezing point. Thermo-erosion of glacier ice expands the lake, and as the glacier ice capping the lake ablates, it is replaced from below by refrozen lake water. Diapiric domes occur on smaller lakes, and pressure ridges on large lakes. Pressure ridges are caused by lateral pressure from the icesheet or glacier. Debris deposits on nunatak slopes above lakes include lacustrine sediments as well as scree and till. Strandlines of boulders indicate stages in icesheet lowering, while water marks on rock bluffs indicate stages in lowering of the lakes. (Auth.)

E-29609

Zhang, Q., Xie, Y., Li, Y., **Preliminary study of the evolution of the post Late Pleistocene Vestfold Hills environment, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.473-477, 19 refs.

DLC QE350.A57 1983

There were at least two glacial cycles in the Vestfold Hills during the Late Quaternary. Much of the present ice-free area was ice-free; some of it was under the sea for a period of unknown duration, ending about 31,000 years BP, and 10,000 BP, ice covered the presently ice-free area with a minimum thickness of 158 m. Glacio-isostatic uplift at the rate of 2.5 mm/yr has caused regression and relative sea level has fallen some 15 m during the last 6000 years. A series of young recessional ice-cored shear-moraines may reflect ice fluctuations in sympathy with neoglacial advances and retreats documented for other parts of the world. Ice fronts have been retreating since this period of advances. (Auth.)

E-29610

Zhang, Q., **Periglacial landforms in the Vestfold Hills, East Antarctica: preliminary observations and measurements,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.478-481, 12 refs.

DLC QE350.A57 1983

Ten types of periglacial landforms engendered by frost-wedging, frost heaving and wind are described from the Vestfold Hills, Antarctica. The periglacial landforms developed on surfaces which have been ice-free less than 5000 years. Expansion and contraction of sorted circles was measured between February 1981 and August 1982 at Mossel Lake. The mean annual growth rate of large sorted circles is between 1.2-10 mm/yr, with a maximum of 6-23 mm/yr. Seasonal expansion and contraction of the sorted circles occurred throughout the period of measurement. Expansion occurs in February and March, and contraction during the period November-January. This shows that the development of sorted circles is active in summer and stable in winter. (Auth.)

E-29619

Stagg, H.M.J., Ramsay, D.C., Whitworth, R., **Preliminary report of a marine geophysical survey between Davis and Mawson Stations, 1982,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.527-532, 5 refs.

DLC QE350.A57 1983

Between January and March 1982, the Australian Bureau of Mineral Resources carried out a seismic and magnetic survey of the continental shelf, slope and rise between Davis and Mawson Stations in the Australian Antarctic Territory. The survey area includes the potentially economically important Prydz Bay. More than 5000 km of 6-fold digital seismic reflection data and about 8000 km of magnetic and bathymetric data were recorded on lines extending from near the coast out to the 3000 m isobath. Processing of this data is still at an early stage and a detailed interpretation is not yet available. The survey was carried out on the M.V. *Nella Dan* and supported by the Antarctic Division of the Department of Science and Technology. Preliminary interpretation indicates the existence of a thick sedimentary section beneath Prydz Bay and a minimum of 2-3 km of sediment at the base of the continental slope. Unfortunately, strong water bottom multiples that appear to be a function of hard bottom sediments, preclude an accurate estimate of the sediment thickness in Prydz Bay itself at this time. It is hoped that future computer analysis of the magnetic data will give estimates of the depth to magnetic basement, and hence an estimate of total sediment thickness. Within Prydz Bay, the seismically visible section appears to be little disturbed by faulting, other than in the southwest corner of the Bay. The marked angularity of reflectors with the sea floor under much of the bay indicates that little deposition is presently occurring. It is still uncertain whether this angularity is the expression of eroded folded ancient rocks or of the topset beds of an oblique prograded sequence. West of Cape Darnley, the thickness of sedimentary rocks appears to be less than in Prydz Bay, although the shallower shelf depths here, 100-300 m, as against 400-700 m in Prydz Bay, make estimating difficult. Deep gashes, 800-1300 m, on the inner side of the shelf are not obviously structurally controlled and are hard to explain. (Auth.)

E-29620

Davey, F.J., Hinz, K., Schroeder, H., **Sedimentary basins of the Ross Sea, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.533-538, 15 refs.

DLC QE350.A57 1983

Seismic refraction and variable angle reflection measurements made using sonobuoys at 98 sites in the Ross Sea define the seismic velocity-depth structure of the sediments and the underlying basement of the Ross Sea continental shelf and margins. 41 new sets of sonobuoy measurements are included in this data set. The data define in greater detail than before two of the three major basins underlying the Ross Sea, that is the Eastern Basin and the Central Trough. New data from the western margin of the Eastern Basin, which detected basement rocks, show that sediment thicknesses were underestimated from the older data, on which basement was not detected. The Central Trough probably extends across the continental shelf edge where sedimentary thicknesses exceeding 4 km are measured. Seismic velocities in excess of 6 km/s were detected at several sonobuoy stations, particularly in the western region suggesting that, perhaps, correlatives of the Jurassic Ferrar Dolerites on land may also occur offshore. (Auth.)

E-29621

Ivanov, V.L., **Sedimentary basins of Antarctica and their preliminary structural and morphological classification,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.539-541, 17 refs.

DLC QE350.A57 1983

The knowledge of sedimentary basins of Antarctica is important to the understanding of the evolution of the entire polar segment of the Earth. These basins occupy major bedrock depressions under marginal seas or ice. Hence, direct information is difficult to obtain and geophysical studies are of considerable importance. A preliminary structural and morphological classification of the basins and some ideas about their genesis are proposed. Sedimentary basins of East Antarctica are developed on an ancient stable platform and fall into intracratonic (Wilkes and Victoria Land) or pericratonic (Prydz Bay—Amery Ice shelf) types. The basins known from West Antarctica are confined to a frontal zone of a geosynclinal fold belt (Bellingshausen and Amundsen seas) and those of boundary type situated in a craton-geosynclinal belt transition area (Weddell and Ross Seas). The study of the latter is of prime importance because they give clues to the relationship and pattern of transition between the Gondwanian and Pacific structures in Antarctica. (Auth.)

E-29622

Faure, G., Taylor, K.S., **Sedimentation in the Ross embayment: evidence from RISP core 8 (1977/78),** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.546-549, 22 refs.

DLC QE350.A57 1983

Sediment recovered at site J9 (88.4S, 168.6W) from beneath the Ross Ice Shelf was deposited from floating ice in Mid-Miocene time but contains some older reworked material. Twenty sediment samples (<150 microm, non-carbonate fractions) taken at regular intervals along core 8 (1977/78) have nearly constant concentrations of Rb, Sr and 87Sr/86Sr ratios. No significant variations occur at the boundary between the "upper" and "lower" units of the sediment in this core. The sediment from Ross Ice Shelf Project (RISP) core 8 (1977/78) is colinear on a Sr-isotope mixing diagram with sediment from USNS *Eltanin* piston cores 32-16, 25 and 36 taken in the Ross Sea. The colinearity of 50 data points indicates that these samples are mixtures of the same two sediment components in varying proportions. The sediment under the Ross Ice Shelf represents one of these components in nearly pure form. The other component is volcanogenic detritus of calc-alkaline composition derived from Mesozoic volcanics in West Antarctica. The feldspar size fractions of bulk sample PNW-23 (1977/78) form a line on the Rb-Sr isochron diagram whose slope yields a date of 174 Ma and an initial 87Sr/86Sr ratio of 0.7155. This date is in excellent agreement with previous age determinations of granitic rocks in the Whitmore Mountains of West Antarctica. Such rocks probably are the source of most of the sediment cored at site J9. (Auth. mod.)

E-29623

Barrett, P.J., Pyne, A.R., Ward, B.L., **Modern sedimentation in McMurdo Sound, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.550-554, 19 refs.

DLC QE350.A57 1983

McMurdo Sound is 50 km wide, lying between the glaciated coast of southern Victoria Land to the west, the volcanoes of Ross Island to the east, and bounded to the south by the McMurdo Ice Shelf. The Sound's main physiographic features are a western shelf (average depth about 200 m), an eastward slope of about 1 deg and an elongate basin 900 m below sea level, which is part of a "moat" around Ross Island. More than 60 samples taken from the floor of the Sound show a wide range of textures, from muddy sandy gravel and sand, mainly on the western shelf and slope, to mud in the deep basins. The samples are compared with a similar number from known situations in an attempt to trace the origins of the seafloor sediment. The main sources identified are: (1) Coastal sand blown by wind onto the sea ice. (2) Basal glacial debris (but only the fine fraction, as the gravel and coarse sand is thought to have melted out near the grounding line). (3) Silt size diatom debris. (4) Supraglacial debris from the McMurdo Ice Shelf and ice-cored moraines nearby. Gravity and bottom currents may be active locally, but appear to be of limited influence. (Auth.)

E-29624

Savage, M.L., Ciesielski, P.F., **Revised history of glacial sedimentation in the Ross Sea region,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.555-559, 15 refs.

DLC QE350.A57 1983

DSDP drill cores from the Ross Sea of Antarctica contain a lengthy stratigraphic record (Oligocene-Holocene) of glacial marine sedimentation in close proximity to the Antarctic continent; previous palaeo environmental interpretations of this important record have been hindered by scanty biostratigraphic information. New diatom, silicoflagellate, and radiolarian zonations are used in a micropalaeontologic study of Miocene-Holocene sediments from Ross Sea Site 273 (western Ross Sea), Site 272 (eastern Ross Sea) and Site 274 (Ross Sea continental rise). Miocene sediments of Site 272 and 273 represent only a fragmentary record of the Early and Middle Miocene. Extremely high sediment accumulation rates (> 150 m/Ma) and the sedimentology and micropalaeontology of these sites are indicative of an open Ross Sea (no large ice shelves) with sedimentation dominated by rapidly calving, debris-laden outlet glaciers. By 16 Ma ago small ice shelves began forming along the western margin of the Ross Sea. The Ross Sea regional disconformity represents a minimum of 10 Ma; bracketing ages are about 14.7 to 4.0 Ma in the western Ross Sea (Site 273) and about 14.0 to <0.6 Ma in the eastern Ross Sea (Site 272). The earliest evidence for an extensive ice shelf is found at continental rise Site 274. A major increase in sand size ice-rafted detritus (IRD) and the initial occurrence of dropstones in Core 12 suggests Ross Ice Shelf formation by 10.0 to 8.5 Ma. Initial formation of the West Antarctic Ice Sheet (WAIS) must have, therefore, occurred after 10 Ma. (Auth.)

E-29625

Steed, R.H.N., **Structural interpretations of Wilkes Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.567-572, 26 refs.

DLC QE350.A57 1983

Radio echo sounding data collected in East Antarctica have been compiled into a bedrock topography map, and reveal areas of separate structural character and distinct N-S structural symmetry. The outcrop of Beacon sediments and Ferrar Dolerite at Horn Bluff appear to have an association with plateau features within the northern Wilkes Basin; and distinct landforms associated with Beacon strata have been identified from radio echo data as occurring along the eastern flank of the basin. The terrain to the west of the basin has rough and faulted forms and satellite magnetic data indicates that the western basin edge is also the boundary of the Precambrian craton. It is concluded that the Wilkes Subglacial Basin is a sedimentary basin developed by tensional growth and subsidence similar to the development of the North Sea Basin. A simple model is presented indicating the tectonic evolution. (Auth.)

E-29627

Miller, H., **Position of Antarctica within Gondwana in the light of Palaeozoic orogenic development,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.579-581, 44 refs.

DLC QE350.A57 1983

Westward progressing rejuvenation and consolidation of the Pacific edge of Gondwana from the shield regions in the direction of a Proto-Pacific ocean eventually terminated in the Antarctic Peninsula's Late Triassic to Early Jurassic metamorphism and deformation as the latest stage of pre-Andean basement evolution. Gondwana reconstructions that place the Antarctic Peninsula west of the southern tip of South America, are confirmed by the joint pre-Andean history of the Gondwana-Pacific border. Palaeozoic and Mesozoic sediment-filled troughs around the southern Atlantic in southern South America and central west Antarctica are interpreted as aulacogens accompanying early stages of Atlantic rifting. (Auth.)

E-29628

Hofmann, J., Weber, W., **Gondwana reconstruction between Antarctica and South Africa,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.584-589, 46 refs.

DLC QE350.A57 1983

Recent geological data from the western part of the East Antarctic Platform and from West Antarctica are used to test the Gondwana reconstruction model of Barker and Griffiths (1977) with special reference to the relationship between Antarctica and South Africa. Archaean rocks in Queen Maud Land are interpreted as a continuation of the Kaapvaal Craton in South Africa. Early to Middle Proterozoic metamorphic rocks in the Shackleton Range, the Haag Nunataks, and the Cape Meredith gneisses of the Falkland Islands are considered to be comparable with the South African Namaqua-Natal Belt. Middle to Late Proterozoic platform development was accompanied by volcanism in both Africa and Antarctica. Late Proterozoic to Early Palaeozoic Ross System (exposed in the Pensacola Mountains, with a miogeosynclinal element in the Argentina Range) is correlated with the Late Proterozoic Malmesbury Belt in South Africa. The present block structure of West Antarctica is discussed in relation to transform fault systems in the southeast Pacific and the southwest Atlantic Oceans. In Antarctica, initial Gondwana breakup was marked by Silurian to Devonian dolerite intrusive activity and related basement thermal reactivation. Final separation of continental Antarctica and Africa took place along overlapping arms of the Early to Middle Jurassic Dufek and Mozambique Triple Junctions. (Auth.)

E-29629

Cosgriff, J.W., Jr., Hammer, W.R., **Labyrinthodont amphibians of the earliest Triassic from Antarctica, Tasmania and South Africa,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.590-592, 13 refs.

DLC QE350.A57 1983

The remarkable and extensively documented correspondence between the reptilian assemblages of the lowermost Triassic of Antarctica and South Africa is now seen to extend to the labyrinthodont assemblages associated with them. Representatives of four families —Brachyopidae, Capitosauridae, Lydekkerinidae and Rhytidosteidae —comprise the total known labyrinthodont assemblage from the Fremouw Formation of Antarctica as well as the major part of that from the *Lystrosaurus* Zone of South Africa. These families plus one additional—Indobrachyopidae—comprise the labyrinthodont assemblage from the Knocklofty Sandstones and Shales of Tasmania. This taxonomic correspondence is of palaeobiogeographical significance as the sites of the three noted assemblages were much closer together on Pangaean geography than they are at present and as they were, during the earliest Triassic, the most southerly of all sites from around the world which have produced tetrapod assemblages of this interval. The four families, here termed the Austral Complex, together with related Lower Triassic families found in other areas, seem to have replaced or supplanted a very different labyrinthodont complex of the Upper Permian. (Auth. mod.)

E-29630

Jefferson, T.H., **Palaeoclimatic significance of some Mesozoic antarctic fossil floras,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.593-598, 36 refs.

DLC QE350.A57 1983

The Early Cretaceous floras of Alexander Island are discussed as indicators of high-latitude palaeoclimate in Antarctica. Forests of trees with large growth rings (up to 9.5 mm) and diverse plant communities grew at supposed palaeolatitudes of 70 to 80 S. Relatively large, entire-margined leaves suggest susceptibility to low temperatures. Complete dormancy, however, which would be necessary to survive the dark polar winter, usually requires low temperatures. Wood anatomy and growth patterns compare most closely with austral warm-temperate rain forests and suggest that there was abundant light throughout a long growing season. High palaeolatitude forests of Permo-Triassic age from the Transantarctic Mountains show similar features of growth and leaf flora composition. The palaeobotanical evidence is apparently inconsistent with light availability in a polar environment even if high temperatures were maintained throughout the winter. This "inconsistency" may be a result of a global warming during the Mesozoic combined with highly specialised floras unique to Mesozoic polar regions, or as a result of large discrepancies between the magnetic and rotational poles during the period. The possibility also exists that there was a reduced Mesozoic obliquity of the Earth, which allowed equable light conditions and temperate floras to extend much further poleward. (Auth.)

E-29634

Schutt, J.W., Cassidy, W.A., Crozaz, G., Fudali, R.F., Marvin, U.B., **Results of meteorite search and recovery activities in the vicinity of the Allan Hills, Antarctica, Dec. 1981-Jan. 1982,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.620-622, 14 refs.

DLC QE350.A57 1983

The Antarctic Search for Meteorites (ANSMET) Expedition spent part of the 1981/82 austral summer working on exposed ice patches in the vicinity of the Allan Hills (76 45' S; 159 40' E), southern Victoria Land. This was the sixth season this region had been visited and meteorites recovered. Three separate icefields were searched either systematically or by reconnaissance and 378 tentatively identified meteorite specimens were recovered. In earlier field seasons little emphasis was placed on accurate mapping of the positions of the meteorites; in recent years, increasing attention has been given to this aspect. During the 1981/82 season most localities were determined by using simple surveying methods. Detailed location maps currently being produced will prove useful in examining questions regarding the distribution and relationship of fragments of individual meteorites, meteorite distributions on the icefields, terrestrial age distributions, and how these may relate to to the mechanisms which concentrate meteorites on the Antarctic ice cap. (Auth.)

E-29635

Cassidy, W.A., **Remarkably low surface density of meteorites at Allan Hills and implications in this for climate change,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.623-625, 7 refs.

DLC QE350.A57 1983

Using a conservative calculation to estimate the expected number of meteorite specimens at Allan Hills, it becomes clear that this meteorite concentration site has been present for only a very small fraction of the lifetime of the East Antarctic ice sheet. Climatic changes probably control the formation and removal of meteorite concentration sites. The last major change to a warmer climate established conditions that produced the present concentration of meteorites at Allan Hills. This probably occurred around 100,000 years ago. (Auth.)

E-29636

Clarke, I., McDougall, I., Whitford, D.J., **Volcanic evolution of Heard and McDonald Islands, southern Indian Ocean,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.631-635, 26 refs.

DLC QE350.A57 1983

Heard Island was built up by three main phases of volcanic activity. The extrusive products of the earliest phase are apparently not exposed and are thought to have been removed by erosion; however, intrusive equivalents occur as mafic bodies in the limestone basement of the island. The intrusions were probably associated with uplift no earlier than the Late Miocene. A second phase of sporadic basaltic volcanism accompanied by glaciation and shallow marine sedimentation commenced in Late Miocene to Early Pliocene times and gave rise to the Drygalski Formation. The final phase produced the youthful volcanic morphology of the island. K-Ar ages are consistent with the final phase commencing no more than 1 Ma ago with the construction of the Big Ben basalt volcano, and they indicate that trachyte and trachyandesite erupted on Laurens Peninsula within the last 10,000 years. The latest volcanism of the final phase was the development of basalt scoria cones and lava fields around the coast, and Mawson Peak on Big Ben. The McDonald Islands are the denuded remains of phonolite volcanism which, according to K-Ar dating, occurred within the last 100,000 years. 87-Sr/86-Sr ratios of Heard Island rocks (0.7047-0.7058) are similar to those of rocks from Iles Kerguelen and the Ninetyeast Ridge. This observation, together with the youthful age of volcanism on Heard Island, is consistent with a model in which all three features were derived from the same mantle source as part of a hot-spot trace. (Auth.)

E-29637

Quilty, P.G., Shafik, S., McMinn, A., Brady, H., Clarke, I., **Microfossil evidence for the age and environment of deposition of sediments of Heard and McDonald Islands,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.636-639, 19 refs.

DLC QE350.A57 1983

Heard Island is dominated by the volcanic edifice of Big Ben but also contains a significant sediment record, which will provide data relevant to unraveling the history of the Gaussberg-Kerguelen Ridge. So far, three intervals of sedimentation can be delineated roughly and there is evidence, from the McDonald Islands, of a fourth. Laurens Peninsula (Heard Island) contains lithified nanno-foram ooze, some tuffaceous, which yielded calcareous nannofossils and foraminiferids. An argillaceous limestone has also provided some miospores and dinoflagellates. Nannofossil and foraminiferid data from beach pebbles and outcrop samples indicate roughly continuous marine sedimentation during much of the Palaeogene and dinoflagellates indicate a probable Early Oligocene to Middle Miocene age for the argillaceous limestone. Preservation generally is poor, and diversity in all groups is low, suggesting generally low surface water temperatures although there are exceptions. Keeled globorotalids are absent and discoasters uncommon. Nannofossil evidence suggests that waters in the Middle-Late Eocene were generally warmer than in the Oligocene. Dark siltstone from Cape Lockyer (south end Heard Island) has yielded a flora of miospores and marine benthic diatoms. All are consistent with a Late Miocene-Pliocene age. Diatoms suggest deposition in water deeper than 120-140 m and the island's vegetation consisted of low scrubby vegetation in a cold wet environment. (Auth. mod.)

E-29638

Nougier, J., Pawlowski, D., Cantagrel, J.M., **Chrono-spatial evolution of the volcanic activity in southeastern Kerguelen (T.A.A.F.),** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.640-645, 29 refs.

DLC QE350.A57 1983

In southeastern Kerguelen alkali basalt sequences were erupted from 25 to 5 Ma. The alkali basalts include (a) basalts without nepheline which flowed between 21 and 18 Ma at a mean rate of one meter thickness in 4000 years, overlain by very recent (0.25 Ma) differentiated bodies of trachyphonolites; (b) in the southeast, olivine-alkali basalts, nepheline-basalts and basanites that erupted between 22 to 20 Ma ago, at a similar mean flow rate, followed by comagmatic extrusions between 10 to 7 Ma. Petrochemical evidence supports the flood basalt eruption process in related areas during the Miocene period as consisting of (a) simultaneous eruptions generated in separate magma chambers, and (b) differentiated felsic lavas erupted at the same time as the nepheline basalts, and suggests a correlation of the distribution of alkali magmatism on Kerguelen with the orientation of transform faults in the surrounding ocean crust. (Auth.)

E-29639

Giret, A., Lameyre, J., **Study of Kerguelen plutonism: petrology, geochronology and geological implications,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.646-651, 17 refs.

DLC QE350.A57 1983

In the Kerguelen Archipelago, studies of plutonic rocks since 1973 provide evidence of several important stages of geological history. There are two kinds of plutonic complexes differing both in their structural setting and their petrological characteristics. The first type occurs as sills and massifs sited in the older plateau basalt series. A 39 Ma K-Ar date have been obtained for two such intrusive complexes; an even older age for the surrounding basalts is inferred. The second type is mainly made up of differentiated alkaline rocks. The rock-type distribution defines two petrological provinces which have a NNW-SSE boundary; the western province is silica (Si)-saturated to Si-oversaturated, while the eastern one is Si-undersaturated. The alkaline magmatism, which appears at present to be in the process of extinction, began 26 Ma ago; it was responsible for the metamorphism and isotopic resetting of the plateau basalts. The linear emplacement of the felsic ring-complexes which parallel the western coast of the main island, and some N-S normal faults which have been observed recently suggest the existence of a rift structure in the open sea to the west. (Auth.)

E-29640

Chevallier, L., Nougier, J., Cantagrel, J.M., **Volcanology of Possession Island, Crozet Archipelago (TAAF),** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.652-658, 20 refs.

DLC QE350.A57 1983

This paper summarises the evolution of the composite oceanic volcano of Possession Island and includes four studies. (a) Volcanotectonism: five phases in three structural cycles are characterised by ringfeeders and radial and linear-fit systems produced by tectonics and pressures exerted from the magma chamber. (b) Petrography: includes an alkali suite of ankaramitic-olivine-basalts and feldspar basalts and underlying basanites and phonolites; mineral assemblages of the eruptive rocks are correlated with structural data and activity of the magma chamber. (c) Geochemistry: 34 representative samples of distinct phases specify the evolution of Na-alkali magma via fractional crystallisation. (d) Geochronology: three cycles, the first being the longest and dated at over 8 Ma, whereas the second (very active) has been going on for 0.3 Ma; the third cycle continues to be present. Correlations with the eastern island of the archipelago indicate that: both volcanoes belong to the same magmatic province; there is no chrono-spatial evolution but rather simultaneous build up; and the activity is connected to the structure and to oceanic floor motion. (Auth.)

E-29641

LeMasurier, W.E., Rex, D.C., **Rates of uplift and the scale of ice level instabilities recorded by volcanic rocks in Marie Byrd Land, West Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.663-670, 21 refs.

DLC QE350.A57 1983

The Hobbs Coast region of Marie Byrd Land includes two major chains of trachytic shield volcanoes and a large number of small satellitic centres of dominantly basaltic volcanism. Basaltic and trachytic hyaloclastites, associated in this region with tillites and glacially striated basement rocks, record the existence of glacial ice during the past volcanic episodes. The ages of these hyaloclastites range from 25 Ma to 0.4 Ma, with the majority being Pliocene and Pleistocene. The only reliable structural datum in this region is a flat pre-volcanic erosion surface. It is well exposed in a number of isolated nunataks, at elevations that range from roughly 600 to 2700 m above sea level and from 200 m to 700 m above the present level of the ice sheet. Much of the hyaloclastite is found on the erosion surface, with the oldest deposits generally found in the highest basement rocks. In these blocks, the erosion surface has been elevated tectonically, while in the adjacent areas it has either remained near sea level where it presumably originated, or been tectonically depressed. This slow rate implies that hyaloclastites younger than 1 Ma old owe their present exposure above ice level almost entirely to the lowering of the ice surface. In the Hobbs Coast region, Pleistocene hyaloclastites stand up to 2000 m above present ice levels. The results to date suggest that it may be possible to infer how long these large scale fluctuations in ice level have been taking place. (Auth.)

E-29642

Takanami, T., Kienle, J., Kyle, P.R., Dibble, R.R., Kaminuma, K., Shibuya, K., **Seismological observation on Mount Erebus, 1980-1981,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.671-674, 4 refs.

DLC QE350.A57 1983

A high sensitivity seismic network was installed on Mt. Erebus (3794 m) in Ross Island, Antarctica during the 1980-81 austral summer field season. The network consists of three permanent seismographs with radiotelemetry links to Scott Base. Two stations are on the western flank at Abbott Peak (1973 m) and Hooper Shoulder (1900 m), 10 and 5 km respectively from the summit crater. The third station is on the southern crater rim of Mt. Erebus. Each station transmits continuously the output from a single, vertical component, one second period, borehole type seismograph. Data are recorded on a 14-channel slow speed magnetic tape recorder. Around 50 events per day were recorded at each station from late December, 1980 to mid-February 1981. A six-station network with portable data recorders was also occupied around the summit crater from 20th December, 1980 to 6th January, 1981. The hypocentre co-ordinates and the origin time of 94 events out of 131 events could be located by using four or more stations out of nine. Some of the 131 events were accompanied with explosions. (Auth.)

E-29643

Collerson, K.D., McCulloch, M.T., **Nd and Sr isotope geochemistry of leucite-bearing lavas from Gaussberg, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.676-680, 39 refs.

DLC QE350.A57 1983

Gaussberg, an isolated late Pleistocene volcano, is situated on the edge of the Antarctic continent, between Mirny and Davis on the apparent extension of the Kerguelen-Gaussberg ridge. It is composed of potassium rich lavas (leucitite) which contain a varied assemblage of inclusions: (1) cognate leucite-clinopyroxene-magnetite, leucite-clinopyroxene-glass, olivine-clinopyroxene-leucite and leucite-clinopyroxene-phlogopite assemblages; (2) partially fused crustal xenoliths; and (3) rare lherzolites. The leucitite data and data for two cognate nodules are quite uniform. They are significantly more enriched from Nd isotopic data presented previously for Kerguelen and lie close to the limit of the field for diopsides from ultramafic nodules in kimberlites. Xenoliths of crustal derivation are extensively contaminated by leucitite. Rare earth patterns for the three lecitites are extremely fractionated. The Nd and Sr isotopic compositions may be the result of mixing between magma derived from either an enriched or a depleted source and pre-existing continental crust. However, in view of the high Nd and Sr content of the lavas and relatively low Nd and Sr contents of identified crustal contaminants it is difficult to envisage how crustal contamination could uniformly modify Nd and Sr isotopic ratios without resulting in a significant change in either major or trace element chemistry. They are, therefore, interpreted as reflecting derivation of the lavas from a highly enriched mantle source region possibly with minor dispersion caused by sea water or crustal 87Sr contamination. Although this enrichment may be the result of mantle metasomatic activity, the preferred explanation is that the parent magma for the leucitites was derived by partial melting of diapirs rising from ancient subducted oceanic crust in the deep mantle. (Auth. mod.)

E-29662

Yomogida, K., Matsui, T., **Physical properties of ordinary chondrites,** *Journal of geophysical research,* Nov. 10, 1983 88(B11), p.9513-9533, Refs. p.9531-9533.

Intrinsic and bulk densities, porosity, compressional and shear wave velocities, thermal diffusivity, and conductivity are measured on 11 ordinary chondrites, one carbonaceous chondrite, and two achondritic clasts of a mesosiderite. With the previously reported results from Antarctic ordinary chondrites, the data are useful in clarifying the difference between H and L chondrites. For example, the intrinsic density of H chondrites is generally higher than that of L chondrites. The sample porosity, less than 20%, strongly controls its elastic wave velocities, thermal diffusivity, and conductivity. Thermal properties are linear functions of elastic wave velocities for both H and L chondrites. The difference between H and L chondrites can be attributed to the content of metallic Fe-Ni. Correlations between petrologic types, which roughly represent metamorphic temperature, and porosity are less obvious for L chondrites than for H chondrites. Since porosity is not changed significantly by impact events, it appears that the sintering process for L chondrites is independent of the metamorphic events represented by petrologic type. (Auth. mod.)

E-29668

Campsie, J., Neumann, E.R., Johnson, L., **Dredged volcanic rocks from the southern oceans: the *Eltanin* collection,** *New Zealand journal of geology and geophysics,* 1983 26(1), p.31-45, 39 refs.

Available data are synthesized and 22 new chemical analyses of dredged volcanic rock samples from a wide variety of morphotectonic settings are presented. Generally, these samples have undergone the variable affects and styles of postmagmatic alteration. The products of alkali volcanism were recovered from scattered localities in the back-arc environment of the Scotia Sea. From the Ross Sea, phonolites, hawaiites, nepheline-mugearite, and alkali basalt were recovered. With the exception of the alkali basalt from the Scott Seamounts, these samples show chemical affinities to both the Erebus and Hallett volcanic provinces. The phonolites from Scott Island and platform are similar in composition to those of Cape Crozier (Ross Island), all of which probably have evolved from a common magma type by fractional crystallisation of a basanite or alkali basalt of similar composition to those of the Balleny Islands. (Auth. mod.)

E-29669

Johnson, G.L., Kyle, P.R., Vanney, J.R., Campsie, J., **Geology of Scott and Balleny Islands, Ross Sea, Antarctica, and morphology of adjacent seafloor,** *New Zealand journal of geology and geophysics,* 1982 25(4), p.427-436, 32 refs.

Scott and Balleny Islands are volcanic edifices. Scott Island rocks are phonolites similar to rocks found in the Hallett volcanic province. New samples from the Balleny Islands presented in this paper are undersaturated alkali lavas identical to those on other oceanic islands. It is suggested that intraplate stress within the Antarctic plate may be responsible for the Scott and Balleny Islands and other large seamount groups within the Ross Sea. (Auth.)

E-29673

Allen, R.B., **Geologic studies of the Scotia arc region and Agulhas Plateau,** New York, Columbia University, 1983, 274p., Univeristy Microfilms order No. 83-27172, Ph.D. thesis. Refs. p.184-198.

Research for this project concentrated on three areas: the Sarmiento Complex area in southern Chile, the South Shetland Islands in Antarctica and the Agulhas Plateau in the southwest Indian Ocean. Studies in the South Shetland Islands concentrated on metamorphic rocks and an ultramafic body. Three metamorphic assemblages indicating different conditions of temperature and pressure were identified. The structures and setting of the dunite body are described and the petrography of the metamorphic rocks is summarized. The Agulhas Plateau is an elevated oceanic plateau with a composite crust, inferred to consist of relatively thickened oceanic crust and a foundered fragment of continental crust. The petrology of metamorphic rocks dredged from the plateau and thought to represent samples of the continental crust is described. (Auth. mod.)

E-29695

Stäblein, G., **Arctic and Antarctica** [Antarktis und Arktis], *Geographische Rundschau,* Mar. 1983 35(3), p.94-100, In German. 16 refs.

An overview is given of the physical aspects of the north and south polar regions and the two are compared. The environments are classed as cold deserts and limitations imposed by the cold are noted. The cold, snow, ice, lack of vegetation, sea ice, polar night, polar summer, and permafrost are cited as the significant factors affecting man's functioning in these areas. Charts, tables, and graphs illustrate some of the details of these topics, the mineral resources, and the temperature curve from 100,000 bp to the present.

E-29696

Miller, H., **Antarctic continent—the heart of Gondwana** [Der antarktische Kontinent—Kernstück von Gondwana], *Geographische Rundschau,* Mar. 1983 35(3), p.101-103, In German. 11 refs.

The geologic history of Gondwanaland is reviewed with special emphasis on the roles of the Antarctic Shield, the Transantarctic Mountains, and plate tectonics in the evolution to current geography in which we identify South America, Africa, Madagascar, India, Australia, New Zealand, and Antarctica.

E-29699

Roland, N.W., **Mineral resources of the Antarctic: present knowledge and possible exploitation** [Mineralische Resourcen der Antarktis: Kenntnisstand und Nutzungsmöglichkeiten], *Geographische Rundschau,* Mar. 1983 35(3), p.120-122, In German. 8 refs.

Several aspects are presented for consideration as means of dealing with antarctic mineral resources. These include: a geological overview; mineral occurrences; metal ore; oil and gas; supply potential and possible yields; exploration status; management criteria; technical criteria; and political criteria. A chart incorporating the ideas of Splettstoesser, Tessensohn, and Zumberge identifies a number of minerals and their locations in Antarctic regions.

E-29703

Siders, M.A., **Intraflow variability, chemical stratigraphy and petrogenesis of the Kirkpatrick Basalt from Mesa Range area, North Victoria Land, East Antarctica,** Columbus, Ohio State University, 1983, 203p., M.S. Thesis. Refs. p.192-202.

Tholeiitic rocks of the Lower Jurassic Ferrar Supergroup of East Antarctica exhibit an isotopic and chemical composition unlike that of the typical continental tholeiite. This thesis examines the chemical composition of the Kirkpatrick Basalt from North Victoria Land (NVL), East Antarctica. The compositional variability was studied with respect to intraflow variability as well as interflow (i.e. stratigraphic) variability. Results of this study suggest that any study concerned with stratigraphic variations in elemental abundances must also consider the range of interflow variability for a reliable interpretation of the data. In addition, a fractional crystallization modeling calculation, which was applied to the NVL data, showed that normal fractional crystallization could explain much of the observed compositional variability in these lavas. The model proposed here to describe the origin of compositional variability in the Kirkpatrick Basalt flows in NVL, is thought to offer a viable alternative to the hypothesis of progressive contamination. (Auth.)

E-29713

Speir, T.W., Cowling, J.C., **Ornithogenic soils of the Cape Bird Adélie penguin rookeries, Antarctica. 1. Chemical properties,** *Polar biology,* 1984 2(4), p.199-205, 20 refs.

Chemical properties were measured on soil samples from five sites, differently influenced by penguin guano, from Cape Bird, Antarctica. Organic C and total N contents were high in the more recently influenced soils, but fell to low levels in soil from the long-abandoned colony (radiocarbon age of penguin remains from the subsurface horizon, 4b, is 7070 years B.P.); total P was less affected. Uric acid and NH4(pos) -N were the major N forms in soil from the occupied and recently-abandoned sites. Re-worked guano and the long-abandoned site contained very little uric acid, but high levels of NO3(neg) -N compared with the other soils. A large proportion of most of these samples was soluble in H2O. The major H2O-soluble ions were NH4(pos) and HPO4(2 neg) in the most recent soils, and Na(pos) and, usually, Cl(neg) in the others. Mg 2(pos) was generally the major exchangeable cation. Results are discussed in relation to previous analyses of antarctic ornithogenic soils, and guano deposits and more normal soils from other parts of the world. (Auth.)

E-29714

Speir, T.W., Ross, D.J., **Ornithogenic soils of the Cape Bird Adélie penguin rookeries, Antarctica. 2. Ammonia evolution and enzyme activities,** *Polar biology,* 1984 2(4), p.207-212, 25 refs.

Ammonia evolution and urease, phosphatase and protease activities were measured after field incubations of soil from 5 sites, differently influenced by penguin guano, from Cape Bird, Antarctica. Rates of NH3 production were low considering the large amounts of free NH3 in these soils. Enzyme activities were higher than expected and, under optimum conditions of temperature, moisture and substrate availability, were sufficient to degrade rapidly the accumulated organic matter in these soils. Laboratory incubations confirmed these high levels of activity; they also showed high dehydrogenase, but not sulphatase, activity. The surface horizon from the site that received continuous additions of fresh penguin excreta had considerably more enzyme activity than the other samples. The optimum activity of phosphatase in this sample was at pH 9.5-10. These enzyme activities are compared with those of New Zealand topsoils, and considered in relation to activities likely to occur under field conditions. Recommendations are made for further biochemical studies at Cape Bird. (Auth.)

E-29722

Moore, P.B., Araki, T., **Surinamite, *ca.* Mg3Al4Si3BeO16: its crystal structure and relation to sapphirine, *ca.* MG2.8Al7.2Si1.2O16,** *American mineralogist,* Jul.-Aug. 1983 68(7/8), p.804-810, 12 refs.

Surinamite is monoclinic, space group *P2/n,* with $a = 9.916(1)$, $b = 11.384(1)$, $c = 9.361(1)$Å, *beta* = 109.30(1) deg. The asymmetric unit is comprised of nine octahedral cations and five tetrahedral cations incorporated in cubic close-packed array of sixteen independent oxygen atoms. R = 0.047 for 2998 independent reflections. The structure consists of octahedral walls running parallel to *x* which are connected along *y* by an open branched chain where one of the tetrahedra, T(1), is principally occupied by Be2+. This tetrahedron is unique in the asymmetric unit in that three of of its vertices are shared by other tetrahedra. Following along [001] in sapphirine and [100] in surinamite, the thicknesses of octahedra and tetrahedra along the [010] direction are: sapphirine: M 4.4.3.3.; T 1.1.2.2.; surinamite M 3.3.3.2; T 1.1.1.2. Several grains of surinamite from Christmas Point, Enderby Land were used in this study. (Auth. mod.)

E-29724

Truswell, E.M., **Recycled Cretaceous and Tertiary pollen and spores in antarctic marine sediments: a catalogue,** *Palaeontographica, Abt. B,* Jun.1983 186(4-6), p.121-174 + 6 plates, Refs. p.168-171.

Phytogeographic information provided by palynomorphs in recycled assemblages is limited by a lack of time control; the pollen and spores are products of reworking of sedimentary rocks of diverse ages. Nevertheless, the reworked microfossils provide a valuable list of taxa that flourished on Antarctica; this list supplements the scarce information available from in situ palynological assemblages, and from macrofossils. In the Early cretaceous, the recycled record expands the diversity of fern, conifer, hepatic and lycopod taxa known previously. It suggests a diversity of Schizaeaceae, Lycopodiaceae and Selaginellaceae. It adds *Coptospora* types to known hepatic spores, and *Asteropollis* to the early angiosperms. In the Late Cretaceous to Early Tertiary interval, the recycled spores and pollen add a number of taxa to those previously known from Antarctica. *Ericipites* pollen types suggest Ericales, and pollen of Euphorbiaceae, Sparganiaceae and Restionaceae are recorded for the first time. The tribe Cupaniae of the Sapindaceae is also a new record. There is also in the recycled material a much clearer indication of diversity within the Proteaceae than was hitherto evident. (Auth. mod.)

E-29732

Hofmann, J., Kaiser, G., Klemm, W., Peich, H.I., **Results of K-Ar age determination of dolerites and metamorphic rocks from the Shackleton Range and Whichaway Nunataks** [Rezul'taty opredeleniia kaliĭ-argonovym metodom vozrasta doleritov i metamorficheskikh porod khrebta Shekltona i nunatakov Uichavaĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.39-43, In Russian. 10 refs.

Age determination using the K-Ar method was carried out on 10 samples of dolerites and metamorphic rocks from the Shackleton Range and the Whichaway Nunataks. The tabulated results show an age range of approximately 163 to 1401 million years.

E-29737

Miagkov, S.M., **Distribution of lakes in the Transantarctic Mountains** [Raspredelenie ozer v Transantarkticheskikh gorakh], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.66-68, In Russian.

Lake distribution in the Transantarctic Mountains is presented in relation to latitude (70-87 S), altitude (0-2000 m), and the size and quality (land or ice) of the lake's underlying surface.

E-29790

Pickard, J., **Pingos in Antarctica,** *Quaternary research,* July 1983 20(1), p.105-109, 8 refs.

Pingos, or ice-cored mounds, are described for the first time from Antarctica and for the first time on ice-cored moraine. Seven pingos up to 4 m high and 12 m in diameter occur on former lake sediments on Flanders Moraine, Vestfold Hills. Lateral wandering of lakes on the moraine exposes water-saturated sediments to freezing and consequent formation of closed-system pingos. The pingos are probably only a few hundred years old. The apparent absence of pingo scars in the Southern Hemisphere may be due to lack of suitable substrates, rather than to unsuitable climatic conditions. (Auth.)

E-29793

Kennett, J.P., **Recent zoogeography of antarctic plankton microfossils,** Zoogeography and diversity of plankton, edited by S. van der Spoel and A.C. Pierrot-Bults, New York, Halsted Press, 1979, p.328-355.

DLC QL123.Z62

A synthesis is presented of the geographic distribution, frequency, and morphologic variation of planktonic foraminifera of the antarctic waters and of the significance of the distribution of water masses.

E-29794

Shimizu, H., Tanaka, T., Masuda, A., **Meteoritic Ce-138/Ce-142 ratio and its evolution,** *Nature,* Jan. 19, 1984 307(5948), p.251-252, 4 refs.

The La-Ce isotopic system coupled with the Sm-Nd system, provides a new isotope tracer for geo- and cosmochemical samples, especially for samples having a Ce anomaly in the rare-earth element patterns. Meteoritic primordial composition of cerium isotopes can serve as a basis for La-Ce systematics. Furthermore, Ce isotopic compositions for meteorites will provide information concerning half-life data of the La138 decay system, which remains uncertain. Cerium isotope ratios are determined for Juvinas, Pasamonte and ALH-78132 eucrites and the Jilin (H4) chondrite. Neodymium isotope ratios and abundances of lanthanum, cerium, neodymium and samarium are also determined for these meteorites. (Auth. mod.)

E-29799

Futa, K., Le Masurier, W.E., **Nd and Sr isotopic studies on cenozoic mafic lavas from West Antarctica: another source of continental alkali basalts,** *Contributions to mineralogy and petrology,* 1983 83(1/2), p.38-44, 28 refs.

The Nd and Sr isotopic ratios on a suite of continental alkali basalts from Marie Byrd Land, West Antarctica, define a change in the source over the range of K/Ar dates between 1 and 28 m.y. ago. The Sr-87/Sr-86 isotopic ratios (0.7026 to 0.7031) are unusually low for continental alkali basalts, although the corresponding Nd-143/Nd-144 ratios (0.51283 to 0.51299) are similar to previously reported values. On a Sr-87/Sr-86 vs. Nd-143/Nd-144 diagram, they define a trend on the low Sr-87/Sr-86 side of the "mantle array", which has a slope steeper than the mantle array. An explanation for the light rare earth elements (LREE) enrichment of the alkali basalts, with high Nd-143/Nd-144 ratios and low Sr-87/Sr-86 ratios, is suggested by a model which modifies the source region with a mantle-derived, CO2-enriched metasomatic fluid. (Auth.)

E-29800

Sears, D.W.G., Ross, M., **Classification of the Allan Hills A77307 meteorite,** *Meteoritics,* Mar. 31, 1983 18(1), p.1-7, 11 refs.

The Allan Hills A77307 meteorite has variously been described as a CO, CV, and a unique CO-CM related chondrite. Its thermoluminescence properties are found to be very different from the established members of the CO chondrite class; it has a TL peak at 170 and a suggestion of a peak at 250 C, while CO chondrites have peaks at 91 and 203. Either the meteorite has suffered some form of alteration or it is not a normal CO chondrite. The latter is consistent with petrologic and compositional data which are interpreted to indicate that although Allan Hills A77307 is related to CO chondrites it is not a normal member of that group. (Auth.)

E-29801

Simon, S.B., Papike, J.J., **Petrology of igneous lithic clasts from polymict eucrites ALHA 76005 and ALHA 77302,** *Meteoritics,* Mar. 31, 1983 18(1), p.35-50, 26 refs.

A total of seven lithic clasts from the polymict eucrites ALHA76005 and ALHA77302 have been studied petrographically and analyzed with the electron microprobe. All clasts are composed predominantly of pyroxene and plagioclase, with or without ilmenite, troilite, Fe-Ni metal, mesostasis, and silica. Pyroxene compositions in unequilibrated clasts and clast bulk compositions, calculated by modal recombination, indicate that the clasts originally crystallized under similar conditions and that they may be genetically related to each other by fractionation of pigeonite and plagioclase. (Auth.)

E-29802

Delaney, J.S., Takeda, H., Prinz, M., Nehru, C.E., Harlow, G.E., **Nomenclature of polymict basaltic achondrites,** *Meteoritics,* June 30, 1983 18(2), p.103-111, 36 refs.

The subgroups within the basaltic achondrite suite are defined using the structural criterion of Wahl (1952). The 'monomict' meteorites are samples of a single lithology while the polymict meteorites are those containing two or more lithologies. The 'monomict' subgroups; eucrites, cumulate eucrites and diogenites are subdivided into both brecciated and unbrecciated meteorites. The polymict achondrites sample a petrological-compositional continuum that contains both mafic and ultramafic rock types and may be subdivided into several groups. Two groups of polymict basaltic achondrites, the polymict eucrites and howardites are separated using an arbitrarily defined criterion. The recommended criterion is based on the amount of magnesian orthopyroxenite (diogenite) component in the meteorite. Howardites contain more than 10% and polymict eucrites contain less than 10%. The criteria proposed (perhaps with minor variations) appear to reconcile the ambiguities caused by the polymict eucrites. These meteorites, using earlier structural criteria, are howardites, but using mineralogical-chemical criteria they are eucrites. As a subgroup of the polymict achondrites, their relationship with the howardites is clear, and the preservation of the term 'eucrite' in their name highlights their modal affinity to the monomict eucrites. Antarctic collections are used to develop the nomenclature. (Auth. mod.)

E-29818

Craddock, C., **Structural relation of East and West Antarctica,** International Geological Congress, 22nd, New Delhi, India, 1964. Proceedings, Pt.4, Rock deformation and tectonics, New Delhi, R.K. Sundaram, 1964, p.278-292, 30 refs.

The Ellsworth Mountains Fold Belt lies between East and northern West Antarctica and provides information on the structural relation between these two contrasting geologic provinces. The continuity of this fold belt with northern West Antarctica is not established, but it is considered a probable southward extension of the mobile belt of West Antarctica. The Ellsworth Mountains Fold Belt is not known to intersect East Antarctica, and it probably terminates south of the Heritage Range or bends eastward to continue under the Filchner Ice Shelf. At least 40,000 feet of folded, mainly Paleozoic metasediments occur in the Ellsworth Mountains. A limestone near the middle of this sequence carries an Upper Cambrian fauna of trilobites, molluscs, brachiopods, and echinoderms, and the youngest formation contains plant stems probably no older than Devonian. Deformation and metamorphism there is thus middle Paleozoic or younger and post-dates the Ross orogeny of Victoria Land. Although its trend seems anomalous, the presence of this Paleozoic geosyncline peripheral to East Antarctica is compatible with the Gondwanaland reconstructions of Du Toit (1937) and King (1958). (Auth.)

E-29828

Dalziel, I.W.D., **Geologic transect across the southernmost Chilean Andes: report of R/V *Hero* Cruise 83-4,** *Antarctic journal of the United States,* Dec. 1983 18(4), p.8-12, 11 refs.

A report of the cruise is made in accordance with provisions of an agreement between the United States and Chile dealing with scientific research in Chilean waters. Details are given of especially significant observations made in Cordillera Darwin, Canal Beagle, Horn Island, Diego Ramirez Islands, Peninsula Hardy, western Isla Navarino, and Isla Packsaddle.

E-29833

Grew, E.S., **Osumilite in the sapphirine-quartz terrane of Enderby Land, Antarctica: implications for osumilite petrogenesis in the granulite facies,** *American mineralogist,* Jul.-Aug. 1982 67(7/8), p.762-787, 77 refs.

It is concluded that the petrogenic grids presented, along with other calculations, experimental data, and the 900C/7kbar estimate for proper conditions for osumilite formation in the Napier complex imply that osumilite should be stable in rocks having temperatures above 750 C, lithostatic pressures not over 8-9 kbar, and water pressure not over 1 kbar. It is further concluded that osumilite should be more abundant than has been reported, possibly having been overlooked because of its similarity in appearance to quartz and cordierite. (Auth. mod.)

E-29846

Birnie, R.V., Thom, G., **Preliminary observations on two rock glaciers in South Georgia, Falkland Islands Dependencies,** *Journal of glaciology,* 1982 28(99), p.377-386, In English with French and German summaries. 19 refs.

Two rock glaciers are described from the maritime sub-antarctic island of South Georgia. The Cooper Sound rock glacier is a spatulate feature, probably ice-cored, 1.5 km long, and developed below a dissected cirque headwall. The Binary Peaks rock glacier is a lobate feature, possibly ice-cemented, only 175 m long, and contiguous with the talus behind it. Evidence for an ice-cored rock glacier in this maritime environment indicates that the debris supply and receiving glacier areas may be more important factors in determining rock-glacier development than zonal climate. (Auth.)

E-29847

Dow, R.L., **Radiolarian distribution and the Late Pleistocene history of the southeastern Indian Ocean,** *Marine micropaleontology,* Sep. 1978 3(3), p.203-227, 50 refs.

DLC QE719.M27

A factor analysis, of radiolarian assemblages in 36 trigger-core tops from the Southeast Indian Ocean at latitudes 40 to 65 S and longitudes 80 to 120 E gives three temperature-related factors and one related primarily to near-bottom processes. A paleoecologic equation was written relating the surface factor values to the present-day observed sea-surface temperatures for summer and winter. By means of a regression technique, paleotemperatures were estimated at the level of the last glacial maximum (18,000 years B.P.) in five *Eltanin* cores and for the last 600,000 years in core E45-74. The average temperature difference along a longitudinal transect of cores crossing the Antarctic Convergence was 2.2 deg colder 18,000 years ago than today. The estimated sea-surface paleotemperatures in E45-74 showed high correlations with radiolarian species diversity indices, the Subantarctic and Antarctic factor values, percent of $CaCO3$, delta 18 O, number of radiolarian fragments and percent *Antarctissa strelkovi.* Based on paleotemperatures and factor values down this core, it is estimated that the Antarctic Convergence was displaced northward to the position of E45-74 six times in the last 600,000 years. (Auth.)

E-29848

Kennett, J.P., **Development of planktonic biostratigraphy in the southern ocean during the Cenozoic,** *Marine micropaleontology,* Dec. 1978 3(4), p.301-345, Refs. p.339-345.

DLC QE719.M27

Paleontological data from the Deep Sea Drilling Project are discussed. They show that the development of Cenozoic planktonic biogeography of the Southern Ocean is intimately linked with the evolution of the Southern Ocean water masses themselves including the Circum-Antarctic Current system, the extensive glaciation of the continent, and the development of the Antarctic Convergence (Polar Front) with related oceanic upwelling. Almost all evolution of calcareous planktonic microfossils has occurred outside of the Antarctic-Subantarctic region followed by limited migration into these water masses. Virtually no endemism occurs amongst calcareous microfossil groups at these latitudes. In contrast, conspicuous and widespread evolution has occurred within the siliceous microfossil groups especially during the Neogene. Low diversity and differences in stratigraphic ranges of Antarctic calcareous microfossils makes them only broadly useful for correlation. Relatively higher diversities within the Subantarctic provide a firmer basis for more detailed correlation, although the ranges of fossils are often different from those at lower latitudes because of different paleoceanographic and paleoclimatic controls. Within the Antarctic water mass south of the Antarctic Convergence, siliceous microfossil biostratigraphy, oxygen isotopic stratigraphy and magnetostratigraphy, provide the only firm basis for correlation with low-latitude sequences. (Auth. mod.)

E-29857

Wrenn, J.H., **Dinocyst biostratigraphy of Seymour Island, Palmer Peninsula, Antarctica,** Baton Rouge, Louisiana State University, 1982, 467p., University Microfilms order No.82-29524, Ph.D. thesis. Refs. p.153-171.

Seventy samples collected from seven stratigraphic sections through the Paleogene Seymour Island deltaic complex were examined. Forty-four dinocyst genera and 75 species were recovered, of which 2 genera and 10 species are new. Specimens attributable to the Acritarcha, Pterospermatales, and Chlorococcales also were noted. The dinocyst floras are composed of cosmopolitan and provincial taxa. The provincial flora, previously named the transantarctic flora, was well developed in and around Antarctica by the Eocene. The distribution of the transantarctic flora suggests that a strait connecting the southwest Atlantic and southwest Pacific oceans existed during the Eocene. Maceral and TOC analyses indicate potential hydrocarbon source rocks exist in the Seymour Island area. (Auth. mod.)

E-29858

Weaver, S.D., Bradshaw, J.D., Laird, M.G., **Geochemistry of Cambrian volcanics of the Bowers Supergroup and implications for the Early Paleozoic tectonic evolution of northern Victoria Land, Antarctica,** *Earth and planetary science letters,* Apr. 1984 68(1), p.128-140, 36 refs.

Rocks of the Bowers Supergroup include volcanics of the Middle Cambrian Glasgow Formation and form a narrow, fault-bounded belt running 350 km across northern Victoria Land from the Southern Ocean to the Ross Sea. The volcanics, which interdigitate with marine volcaniclastic sediments in a 3.5-km-thick succession, comprise pillow lavas and breccias of basalt and andesite with subordinate dacite-rhyolite. Basic rocks are notably depleted in Ti-Zr-Y and high in Mg-Ct-Ni, and are interpreted as primitive island arc tholeiites. Southwest of the Bowers belt lie high-grade metamorphic rocks of the Precambrian Wilson Group, cut by Cambro-Ordovician S-type granitoids. To the northeast are low-grade metasediments of the Late Precambrian or Early Palaeozoic Robertson Bay Group. Geological relationships between the Bowers Supergroup and the Wilson and Robertson Bay Groups are enigmatic and controversial. A number of tectonic models for the Lower Palaeozoic of northern Victoria Land are advanced. It seems likely that major strike-slip faulting was significant in the Early Palaeozoic evolution of this sector of the Gondwana margin, and that some currently adjacent terranes have allochthonous relationships. (Auth.)

E-29860

Eittreim, S.L., Cooper, A.K., **Marine geological and geophysical investigations of the antarctic continental margin, 1984,** *U.S. Geological Survey. Circular,* 1984 No.935, 12p., 11 refs.

This report summarizes surveys made during 1984 and includes a description of the types of data collected and a brief discussion of preliminary results based primarily on shipboard analyses of unprocessed seismic and other geophysical data. Participants on the scientific crew of the *S.P. Lee* for the two legs, including scientists from academic and government institutions of Australia and New Zealand, are listed. Charts of the coastal region off Wilkes Land and in the Ross Sea are included and indicate the kinds of data gathered at these locations during the legs of the cruise. Seismic reflection data are shown and interpreted. (Auth. mod.)

E-29862

Schaefer, R.G., Leythaeuser, D., Von der Dick, H., **Generation and migration of low-molecular weight hydrocarbons in sediments from Site 511 of DSDP/IPOD Leg 71, Falkland Plateau, South Atlantic,** International Meeting on Organic Geochemistry, 10th, Bergen, 1981. Advances in organic geochemistry 1981, edited by M. Bjoröy et al, Chichester, John Wiley & Sons, 1983, p.164-174, 20 refs.

DLC QE516.5.I57 1981

Concentration and detailed composition of low molecular weight hydrocarbons have been measured in sediment core samples from 160-650 m depth. Analysis was carried out by a combined hydrogen stripping/thermovaporization method and subsequent capillary gas chromatography. Total light hydrocarbon yields, which represent both hydrocarbons dissolved in the pore water and those adsorbed on clay minerals, vary from 24 ng/g of dry weight sediment in the Coniacian/Upper Santonian zeolitic claystones to 17 400 ng/g in the Upper Jurassic 'black shales'. The concentration encountered in the lowermost part of the 'black shales' is in accordance with the quantity of light hydrocarbons generated by type-II kerogen-bearing petroleum source beds in an early maturity stage. Generally, low-molecular weight hydrocarbons in Hole 511 are formed *in situ* and remain at their place of formation. Indications for a redistribution of light hydrocarbons are observed around the Tertiary/Cretaceous unconformity, and at the contact between the 'black shales' and the overlying chalks and claystones. Redistribution patterns are interpreted to reflect a combination of several processes: bulk migration of light hydrocarbons along with moving compaction waters, replenishment of the depleted intervals by mobile, gas-range hydrocarbons possibly by diffusion, and the enrichment of polar compounds such as benzene and toluene in those intervals where an excessive flow of compaction water has occurred. (Auth.)

E-29865

Williams, D.F., Corliss, B.H., **South Australian continental margin and the Australian-Antarctic sector of the southern ocean,** The Ocean basins and margins, Vol.6: The Indian Ocean, edited by A.E.M. Nairn and F.G. Stehli, New York, Plenum Press, 1982, p.545-584, Refs. p.579-584.

DLC QE39.N27 vol.6

This paper summarizes the structural and morphological characteristics of the South Australian margin, South Australian Basin, Southeast Indian Ridge and South Indian Basin in the region between approximately 100 E and 150 E longitude. Sedimentation and depositional processes in the area are discussed, and the evolution of the Australian-Antarctic sector of the southern ocean is reviewed. The margins along western Tasmania, the Naturaliste Plateau and Antarctica are not included. The Australian-Antarctic sector of the southern ocean is one of the few areas known to exhibit asymmetric sea floor spreading. The distribution of sediments in this region has been influenced by a complex interplay among numerous factors: (1) the separation of two continental land masses with significant differences in elevation and climatic histories; (2) the development of thermohaline circulation and water mass/productivity patterns in the southern ocean; and (3) the creation of widespread regional unconformities by vigorous bottom-water circulation. (Auth. mod.)

E-29866

Upton, B.G.J., **Oceanic islands,** The ocean basins and margins, Vol.6: The Indian Ocean, edited by A.E.M. Nairn and F.G. Stehli, New York, Plenum Press, 1982, p.585-648, Refs. p.643-648.

DLC QE39.N27 vol.6

The structural geology, surface topography, geochemistry, bathymetry, and volcanic origins are discussed for the islands of the Indian Ocean. Those in the subantarctic zone include Marion and Prince Edward Islands, Crozet, Kerguelen, Heard, and Amsterdam and Saint Paul.

E-29867

Grew, E.S., **Antarctic margin,** The ocean basins and margins, Vol.6: The Indian Ocean, edited by A.E.M. Nairn and F.G. Stehli, New York, Plenum Press, 1982, p.697-755, Refs. p.744-755.

DLC QE39.N27 vol.6

The present paper should be regarded as a progress report on current work in the Indian Ocean sector of Antarctica and on the stage of our knowledge of this part of the continent. Salient geologic, geophysical, and physiographic features of the sector are emphasized and a few comparisons are made with Peninsular India and Australia, continents believed to have been formerly contiguous with Antarctica. There remain many outstanding problems and gaps in our knowledge of Antarctica, more than in other areas, because of the extensive ice cover and harsh climate. An imperative for future regional geologic surveys in East Antarctica is systemic geochronologic sampling for Rb-Sr and U-Pb isotope analyses. Of particular interest are the granulite-facies rocks of Enderby Land, which are purported to be among the most ancient on earth. A second imperative is large-scale gravity and magnetic surveys. These could provide much needed data on crustal structure and definition of tectonic provinces, particularly in areas of extensive ice cover. (Auth. mod.)

E-29868

Cogley, J.G., **Deglacial hypsometry of Antarctica,** *Earth and planetary science letters,* Mar. 1984 67(3), p.284-296, 36 refs.

A new and more detailed analysis of the hypsometry of the Antarctic continent, based upon 1 deg digital data on ice thickness and surface and subglacial elevations, shows that Antarctica, even when deglaciated according to a simple Airy-isostatic model, is an unusual continent. It is the only one with a markedly bimodal hypsometric curve, and separation of the two modes shows that they are the single modes of West Antarctica (at -450 m a.s.l.) and East Antarctica (at 950 m a.s.l.) respectively; the two parts of the continent are probably distinct tectonic entities. The modal height of East Antarctica is 700 m higher than that of the global ensemble of continents, suggesting that hotspot epeirogeny or a less well-known mechanism has affected its recent history. The age of this modal-height anomaly has important tectonic and especially climatic implications: it is equivalent to a 4-6 C cooling of the continental surface. The area of dryland after deglaciation is 10.5 million sq km; the volume of ice in Antarctica is estimated at 26.9 million cu km, and of ice in the Northern Hemisphere at 2.5 million cu km; these figures lead to a eustatic sea-level equivalent for present-day glacier ice of 68 m or somewhat less. (Auth.)

E-29870

Smith, J.V., Steele, I.M., Leitch, C.A., **Mineral chemistry of the shergottites, nakhlites, Chassigny, Brachina, pallasites, and ureilites,** *Journal of geophysical research,* Nov. 15, 1983 88(Suppl.), Lunar and Planetary Science Conference, 14th, Houston, 1983, Proceedings Part 1, p.B229-B236, 26 refs.

The mineral chemistry is compared for selected achondrites. Olivine in the ALHA77005 and EETA79001 shergottites, olivine-rich Chassigny and Brachina, and the nakhlites contains Ni indicative of oxidizing conditions, whereas pallasitic and ureilitic olivines contain much lower Ni due to reducing conditions. The Brachina olivine and pyroxene have distinctively higher Fe/Mn than the shergottites and Chassigny further indicating that Brachina is unique. The Chassigny and 77005 olivines contain lower Cr_2O_3 (0.03 wt %) than the Brachina and 79001 olivines. Values of Fe/Mn for cumulus augites in nakhlites are higher than for the shergottites, whereas those for ferropigeonites are not. The 77005 shergottite contains troilite FeS in contrast to 79001, Shergotty, Zagami, and Chassigny, which contain pyrrhotite. The present survey indicates that at least Brachina is not chemically cogenetic with the other 'oxidized achondrites,' and that the Fe/Mn ratio of the cumulus augites in nakhlites is a problem for the assignment of the nakhlites, shergottites, and Chassigny to a single genetic group. (Auth.)

E-29871

Takeda, H., Wooden, J.L., Mori, H., Delaney, J.S., Prinz, M., Nyquist, L.E., **Comparison of Yamato and Victoria Land polymict eucrites: a view from mineralogical and isotopic studies,** *Journal of geophysical research,* Nov. 15, 1983 88(Suppl.), Lunar and Planetary Science Conference, 14th, Houston, 1983, Proceedings Part 1, p.B245-B256, 54 refs.

New interior samples of four Yamato polymict eucrites (Y74159, Y74450, Y75011, and Y75015) have been studied by electron microprobe, transmission electron microscope, and X ray diffraction techniques, and compared with several samples of the Victoria Land polymict eucrites. These samples have been analysed using Rb-Sr and Nd-Sm isotopic systematics. Several grains of inverted pigeonite, with blebby augite similar to those in Binda and Moama, have been identified in all four Yamato eucrites. Coarse-grained mesostasis-rich subophitic basalts, which contain Mg-rich pigeonite (with Fe-rich olivine veinlets) zoned outward to subcalcic ferroaugite rims, have also been found. These unique clasts were not found in ALH76005, 77302, 78040, 78158, and 78165 and EET eucrites. The tight grouping of Rb/Sr and Sm/Nd ratios, and similar modal compositions of the Yamato group indicate that they are most likely to be pieces from a single fall, and distinct from the ALH and EET groups. However, the Yamato, Allan Hills, and Elephant Moraine groups may sample a few distinct magmas or similar but different source regions on the same parent body. (Auth.)

E-29872

Sears, D.W.G., Weeks, K.S., **Chemical and physical studies of type 3 chondrites: 2. Thermoluminescence of sixteen type 3 ordinary chondrites and relationships with oxygen isotopes,** *Journal of geophysical research,* Nov. 15, 1983 88(Suppl.), Lunar and Planetary Science Conference, 14th, Houston, 1983, Proceedings Part 1, p.B301-B311, For Part 1 see E-27802. 40 refs.

Thermoluminescence (TL) sensitivity values for sixteen type 3 ordinary chondrites, fourteen of them from Antarctica, have been measured. The values obtained (Normalized to the TL sensitivity of the Dhajala meteorite) range from 1.6 (Allan Hills A77216) to 0.010 (Allan Hills A77176), and include two (Reckling Peak A80207 and Allan Hills A77176) that are particularly low. The histogram of TL sensitivity values now shows a single distribution with higher values preferred; it resembles the histogram for L chondrites occupying the petrologic types 3, 4, 5, and 6. There is a tendency for the TL sensitivity of meteorites to decrease as *delta*O-18 increases. Meteorites with intermediate TL have intermediate *delta*O-18. Theoretically it is possible that the range of *delta*O-18 values observed may reflect progressive loss of O in the form of CO at very low temperatures, but very restrictive physical conditions and a complex history seem to be required. (Auth. mod.)

E-29875

Kotra, R., **Organic analysis of the antarctic carbonaceous chondrites,** College Park, University of Maryland, 1981, 178p., University Microfilms order No. 82-02611, Ph.D. thesis. Refs. p.166-178.

Three antarctic carbonaceous chondrites were acquired for organic analysis. These were the Allan Hills 77306 (type C2), Allan Hills 77307 (type C3) and the Yamato 74662 (type C2). The results of this first study on the antarctic carbonaceous chondrites indicate that they have been well-preserved. The organic compounds are of extraterrestrial abiotic origin. This detailed study of amino acids and hydrocarbons has doubled the number of well-preserved meteorites in which organic compounds have been determined. Evidence for several new compounds has also been obtained. Substantial evidence has been obtained in support of the abiotic synthesis of organic molecules in the solar system. (Auth.)

E-29902

Leg 28 deep-sea drilling in the southern ocean, *Geotimes,* June 1973 18(6), p.19-24.

Shown and discussed are: 1) a polar stereographic projection of locations of Leg 28 drill sites with water depths between 1,000 and 3,000 m marked; 2) an orthographic drawing of the Ross continental shelf; 3) the stratigraphic and sedimentological record of 5 sites and 4) a schematic cross-section of the Ross embayment compiled from the work of various authors and Leg 28 results. Activities and findings at 11 holes are summarized from a glaciological, climatological, biostratigraphic and geological points of view.

E-29903

Deep-sea drilling in the roaring 40's, *Geotimes,* July 1973 18(7), p.14-17.

The following are some of the conclusions based on shipboard observations of Leg 29: 1) Basaltic basement obtained from the northern Macquarie Ridge is of early Miocene age (20 m.y.a.). 2) The development of Antarctic Circumpolar Current occurred in the middle Oligocene. 3) Valuable biostratigraphic sequences were obtained in the Antarctic regarding paleoclimatological and paleoglacial history. 4) Biogenic productivity was low during the Oligogene. A profound increase commenced late in the middle Pliocene, caused by an intensification of upwelling associated with the Antarctic Convergence and related to increased bottom-water activity.

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E-29904

Southwest Pacific structures, *Geotimes,* Sept. 1973 18(9), p.18-21.

Leg 30 of the Deep Sea Drilling Project, continuing to check the age patterns in collected sediments begun on earlier cruises, found that more than about 80 m.y.a. Australia, New Zealand and Antarctica existed as a single land mass. The Phoenix anomalies were developing, associated with a spreading pole which migrated southward. 80 to 56 m.y.a. the beginning of northward migration of Australia from Antarctica took place.

E-29905

Phase 3: Deep Sea Drilling Project, *Geotimes,* Sept. 1973 18(9), p.22-26.

Part of this article is a review of scientific reports for Legs 28 and 29, which found on previous cruises that Australia, New Zealand, Tasmania and Antarctica separated in early Cenozoic, how the Antarctic Circumpolar Current developed, and that the antarctic glaciation began in the middle Miocene, reached a maximum about 5 m.y.a. then retreated to approximately its present position. Plans for future drillings, and the scope of future studies, are outlined.

E-29916

Burrett, C.F., Findlay, R.H., **Cambrian and Ordovician conodonts from the Robertson Bay Group, Antarctica and their tectonic significance,** *Nature,* Feb. 23, 1984 307(5953), p.723-726, 32 refs.

Upper Cambrian and Lower Ordovician conodonts in a limestone block within rocks mapped as Robertson Bay Group in the southeastern part of North Victoria Land are reported. This discovery necessitates a reappraisal of tectonic reconstructions of the pre-Mesozoic units of southeast Australia, New Zealand and Antarctica. A reconstruction is proposed which includes correlation of the Lower Ordovician Greenland Group, New Zealand and the Upper Cambrian-Lower Ordovician Wierah Formation of southern Tasmania. (Auth. mod.)

E-29920

Marvin, U.B., **Meteorites on ice,** *Planetary report,* Mar./Apr. 1984 4(2), p.12-14.

The author points out in lay terms significant discoveries about meteorites found in Antarctica. She writes of the first find in 1973 by Japanese scientists in the Yamato Mountains and the large number of finds by U.S. scientists in the Allan Hills since then. Moon rocks have been found and possibly some from Mars. The total number of individual finds is almost one third the total found during all of the preceding two centuries.

E-29924

Simon, S.B., Papike, J.J., Fuhrman, M., **Petrology of EETA79006 and implications for the formation of polymict eucrites,** *Meteoritics,* Sep. 30, 1982 17(3), p.149-162, 17 refs.

A newly found polymict eucrite, EETA79006, is described. Lithic clasts are similar to those found in howardites and fall into four groups: fine-grained (aphanitic), coarse-grained, basaltic, and cataclastic. All have eucritic compositions and differ mainly in cooling and deformation histories. Some basaltic clasts cooled faster than others and may be impact melts. Analysis of pyroxene and feldspar in the matrix and in 20 lithic clasts indicates that the matrix was not derived from the observed lithic clast population. This meteorite and similar polymict eucrites may have formed by addition of younger, more fractionated, lithic clasts to the regolith of the parent body. (Auth.)

E-29937

Sokolov, V.N., Chepizhnyĭ, K.I., Moskalevskiĭ, M.IU., **Morphological peculiarities of quartz grain surfaces in recent basal moraines of King George Island (South Shetland Islands)** [Morfologicheskie osobennosti poverkhnosti kvartsevykh zeren sovremennykh donnykh moren o. King-Dzhordzh (IUzhnye Shetlandskie o-va)], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ. Khronika obsuzhdeniia,* Apr. 1983 Vol.47, p.221-226, In Russian with English summary. 6 refs.

Sand samples, obtained from the basal moraines of King George Island, and their fine fractions 0.25-0.10, 0.10-0.05 and 0.05-0.01 mm, were studied in the electron microscope "QUICKSCAN-106 A" with magnification power of 300 to 20,000. Morphological peculiarities of quartz grain surfaces: etchings and micro-crevassing are explained by temperature changes caused by freeze-thaw cycles of moraines and active chemical dissolution. Results obtained confirm the validity of regarding cryogenic weathering at the glacier bed as an independent process in the moraine forming activities of glaciers.

E-29964

Giret, A., **Marine intraplate plutonism: example of Kerguelen Islands** [Plutonisme océanique intraplaque: exemple des iles Kerguelen], *Comité national français des recherches antarctiques. CNFRA,* 1983 No.54, 290p., In French. Refs. p.275-290.

The first part of this report of geological investigations on Kerguelen Islands discusses the plutonic complexes of the archipelago. In the second part, the discussion comes under three headings: minerals; the elements and their interpretation; and the Kerguelen magmas, their source and evolution and comparison with the continents. It is concluded that one finds in Kerguelen's history episodes characteristic of some oceanic islands suggesting a general model of evolution. An extensive bibliography is included.

E-29971

Ballestracci, R., Nougier, J., **Detection by infrared thermography and modelling of an icecapped geothermal system in Kerguelen Archipelago,** *Journal of volcanology and geothermal research,* Mar. 1984 20(1-2), p.85-99, 20 refs.

In order to investigate the geothermal fields in the volcanic islands of Kerguelen, and taking account of the difficult field and meteorological conditions, an infrared survey was conducted by a helicopter-borne thermocamera on the slopes of the recent volcano of the Rallier du Baty peninsula where fumaroles were previously found. Four active zones were observed. Fumaroles and hot water springs are located near the limits of the icecap which covers all the upper part of the peninsula. Joint infrared and normal TV imageries have been largely sufficient to obtain detailed surveys of these active zones. A tentative model of the icecapped geothermal system has been drawn, the main feature being that the supply of convective heat from the recent and still warm magmatic chamber is too low and local for melting all the icecap but remains high enough to insure its slow fusion and the discharge of steam and hot water at its periphery. (Auth.)

E-29972

Goslin, J., Patriat, P., **Absolute and relative plate motions and hypotheses on the origin of five aseismic ridges in the Indian Ocean,** *Tectonophysics,* Feb. 1, 1984 101(3-4), p.221-244, Refs. p.242-244.

Paleopositions of the African, Indian and Arctic plates are used as an independent set of data to test various hypotheses, derived from geophysical data on the origin, emplacement mechanism and evolution of five aseismic structures of the western and southern Indian

Ocean. Except for a continental fragment of very limited extent bearing the Seychelles Islands, these structures are probably due to anomalous volcanic episodes at—or near—active plate boundaries, rather than to intraplate emplacement. Their creation processes are therefore mainly related to the relative motions between the Antarctic, African and Indian plates. The volcanic episodes are synchronous with major changes in the relative motions between these plates and thus substantiate the role played by frequent irregularities in the kinematic pattern of the western and southern Indian Ocean, such as ridge jumps, asymmetric spreading and rapid variations in spreading velocity or direction. Finally, it is believed that thermal anomalies, located not far from active spreading boundaries, may have played a role in the physical processes creating the aseismic ridges. (Auth.)

E-29984

Nagata, T., ed, **Proceedings of the Eighth Symposium on Antarctic Meteorites,** *Tokyo. National Institute of Polar Research. Memoirs,* Dec. 1983 Special issue No.30, 457p., Numerous refs. For individual papers see E-29985 through E-30016.

This Eighth Symposium on Antarctic Meteorites was held February 17 through 19, 1983 at NIPR in Tokyo. Thirty-five scientific papers compiled in this volume cover various subjects related to Antarctic meteorites, such as antarctic meteorite search, petrological, mineralogical, chemical, physical and metallographical studies of antarctic meteorites and planetological discussions based on the results of meteoritic research. Some of the papers describe new significant results of meteorite studies and propose new ideas for interpretation of meteoritic data, while some others simply deal with the results of preliminary analyses of new meteorites. Eight of the papers are by overseas scientists. (Auth. mod.)

E-29985

Yoshida, Y., Sasaki, K., **Search for Yamato meteorites in December 1981,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.1-6, 5 refs.

Search for antarctic meteorites was carried out by the wintering party of the 22nd JARE in the Meteorite Ice Field near the Yamato Mountains. Search in the hexagonal experiment area showed that the emergence of meteorites from the ice sheet due to ablation of ice took place at a rate of one meteorite per year per sq km during two years. Collected specimens are 133 in number, 25.928 kg in weight, and consist of ordinary chondrites, carbonaceous chondrites and diogenites. Distribution of occurrence sites suggests that a bare ice field near small nunataks is the meteorite-concentration area, as was pointed out before. (Auth.)

E-29986

Mason, B., Yanai, K., **Review of the Yamato-74 meteorite collection,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.7-28, Refs. p.25-28.

Examination of the specimens and petrological investigation of thin sections of many of them, and review of the literature, has enabled the classification of 543 out of a total of 663 meteorites in the 1974 Yamato collection, including all those weighing more than 100 g. The classified meteorites include 1 pallasite, 3 ureilites, 22 diogenites (all paired), 3 eucrites, 3 C2 chondrites, 1 E3-4 chondrite, 10 H3 chondrites, 4 L3 chondrites, 1 LL3 chondrite, 32 H4 chondrites, 3 L4 chondrites, 2 LL4 chondrites, 212 H5 chondrites (of which 149 are probably pieces of a single meteorite), 5 L5 chondrites, 193 H6 chondrites, 5 LL6 chondrites and 1 H4 or L4 chondrite. (Auth.)

E-29987

Yanai, K., Matsumoto, Y., Kojima, H., **Brachina-like inclusion in the Yamato-75097 L6 chondrite: a preliminary examination,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.29-35, 2 refs.

The inclusion has a shiny black fusion crust, is relatively large (2.5x2.5x0.8 cm) and about 15 g in weight. The fusion crust is distinguished clearly from the dull black fusion crust of the host. Microscopically, the inclusion has a fine-grained granular texture consisting mainly of olivine with minor merrillite and plagioclase, and a little chromite. Plagioclase is isotropic and presumably maskelynite. Pyroxene, nickel-iron and trolite were not identified. The texture of the inclusion appears to be similar to that of the Brachina meteorite. Compositions of the constituent minerals are olivine average Fo76, maskelynite An15Ab75Or10, and merrillite. Olivine is compositionally homogeneous and relatively Mg-rich compared with that of Brachina. The olivine composition is very similar to that of the host. (Auth.)

E-29988

Matsunami, S., **Inclusion of ALH-77004: a possible surface regolith of L chondrite parent body,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.36-44, 21 refs.

An inclusion in ALH-77004 (H4 chondrite) consists of four different constituents with varying degree of recrystallization; (1) moderately to highly recrystallized lithic and chondrule fragments (fayalite-rich group), (2) unequilibrated chondrules (fayalite-poor group), (3) fine-grained dark clastic matrix, and (4) particles of Fe-Ni metal, trolite, and chromite. From petrological examinations of these constituents, it is suggested that the inclusion was a surface regolith of the L chondrite parent body formed by repetitive impact cratering processes extended to various depths of the body. (Auth.)

E-29989

Nagahara, H., **Texture of chondrules,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.61-83, 20 refs.

Textures of chondrules in the unequilibrated ordinary chondrites have been summarized on the basis of the processes of their formation inferred from the results of previous experiments. The chondrules studied are classified by their textures into the following four groups: (1) those formed by complete melting of the precursor materials, (2) those formed by incomplete melting of the precursor materials, (3) "lithic fragments" or "lithic chondrules" formed through low temperature heating of the precursor materials, and (4) complex chondrules formed by accretion of two chondrules or by squeezing out the liquid. Groups (1) and (2) are further classified into different subgroups depending on their texture and constituent minerals. The subgroups in group (1) include barred olivine chondrules, radial pyroxene chondrules, and glassy chondrules. (Auth. mod.)

E-29990

Ikeda, Y., **Alteration of chondrules and matrices in the four antarctic carbonaceous chondrites ALH-77307, Y-790123, Y-75293(C2), and Y-74662(C2),** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.93-108, 20 refs.

Alteration products consist mainly of chlorite (and/or berthierine) containing high Al2O3 contents, and those of the matrices are mainly serpentine with minor amounts of Al_2O_3 contents. This difference reflects that of their precursor materials prior to the alteration. The degrees of chondrule alteration are various within a chondrite and among the four chondrites studied, and are classified into four stages ranging from weak to intense alteration according to petrographic criteria. Most chondrules in ALH-77307 are stage II, and those in Y-74662 are stage III. Y-790123 and Y-75293 include the chondrules of stages II and III. The alteration of chondrules and matrices took place prior to the final agglomeration of these chondrites. (Auth.)

E-29991

Haramura, H., Kushiro, I., Yanai, K., **Chemical compositions of antarctic meteorites, I,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.109-121, 17 refs.

Sixty-four chondrites, 32 achondrites and 2 rare stony-iron meteorites from Antarctica were analyzed by standard wet chemical analysis method. Analyses of the chondrites and the stony-iron meteorites are reported. Many antarctic meteorites are more or less weathered or oxidized. Analyses of fresh and weathered parts of three chondrites indicate that abundances of most major elements are essentially the same between the two parts except for the proportions of Fe, FeO and Fe_2O_3. The analyses of the chondrites show that H chondrites and L and LL chondrites are distinct in several components. When iron and FeS are subtracted, however, all the ordinary chondrites have essentially the same compositions. (Auth. mod.)

E-29992

Ikeda, Y., **Major element chemical compositions and chemical types of chondrules in unequilibrated E, O, and C chondrites from Antarctica,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.122-145, 27 refs.

The major element chemical compositions of most chondrules correspond to the compositions of mixtures of olivine and low-Ca pyroxene with constant amounts of feldspar (or feldspathoid) and high-Ca pyroxene; other chondrules contain variable amounts of normative feldspar (or feldspathoid), high-Ca pyroxene, spinel, SiO_2-minerals, etc. The Al, Na, and K contents of most chondrules reflect the composition of the ternary feldspar (An-Ab-Kf) of the chondrule precursor material, and chemical types of chondrules (KF, SP, IP, CP) are defined on the basis of the proportions of Al, Na, and K. The KF chondrule type is restricted to brecciated LL chondrites. The CP type is rare, and occurs mainly in carbonaceous chondrites. The SP and IP types are most abundant in all chondrites; the relative frequency of SP and IP types differs among brecciated LL type chondrites, ordinary chondrites (except for the brecciated LL type), and carbonaceous chondrites. (Auth.)

E-29993

Kimura, M., **Chemical and petrological relations of the constituent units in ALH-77249 meteorite (L-3),** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.146-167, 22 refs.

The ALH-77249 meteorite is identical with ALH-77015 and probably -77033. ALH-77249 consists of chondrules, mineral fragments, several types of inclusions, and a matrix in order of amount. Some inclusions were derived from precursor materials which are depleted in a plagioclase component. Some other inclusions were derived from chondrules through shock metamorphism. Early-formed chondrules were frequently disaggregated to form a large amount of silicate mineral fragments. ALH-77249 includes some carbonaceous chondritic materials such as an amoeboid olivine inclusion and matrix. (Auth.)

E-29994

Takahashi, E., **Melting of a Yamato L3 chondrite (Y-74191) up to 30 Kbar,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.168-180, 22 refs.

The solidus of the chondrite is defined by eutectic melting of Fe-Ni-S at about 950 C regardless of pressure. At 15 kbar, the silicate solidus of the chondrite is about 250 C higher than the metal/sulfide eutectic solidus and the temperature interval between the two solidi widens as pressure increases. Composition of the metal/sulfide melt changes from FeS-rich to Fe-Ni-rich with temperature increases. At low temperatures below the silicate solidus, the metal/sulfide melts are small isolated patches dispersed in grain boundaries of silicate minerals. At high temperatures, the metal/sulfide melts become numerous globules surrounded by silicate melts. Segregation of the ferrobasaltic partial melt on top of the residual olivines and the metal/sulfide globules has been observed. Based on the partial melting experiments a model for genesis of a pallasite meteorite is proposed. (Auth. mod.)

E-29995

Takeda, H., Mori, H., Delaney, J.S., Prinz, M., Harlow, G.E., **Mineralogical comparison of antarctic and non-antarctic HED (howardites-eucrites-diogenites) achondrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.181-205, Numerous refs.

Mineralogical examination of thin sections indicates that they contain a variety of lithic components. Some of these components occur both as monomict meteorites and as clasts in polymict meteorites, whereas others occur only as clasts in some polymict breccias. The components may be classified by the degree of homogenization of of the pyroxene present. In order of increasing homogeneity these are: (1) Y-75011-type basalt clasts; (2) Pasamonte; (3) Y-790266-type clasts; (4) Stannern and Nuevo Laredo; (5) Juvinas and Haraiya; and (6) Ibitira (?). Type 1 has been least modified by post-igneous thermal annealing, while types 5 and 6 were thoroughly metamorphosed. Three types of cumulate eucrites are recognized and are believed to represent (a) cumulates from thick lava flows or layered intrusions; (b) lunar highlands type crust; and (c) differentiation products of diogenitic magmas. (Auth.)

E-29996

Delaney, J.S., Takeda, H., Prinz, M., **Modal comparison of Yamato and Allan Hills polymict eucrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.206-223, 30 refs.

Comparison of modal analyses of seven Yamato and six Allan Hills polymict eucrite specimens reveals differences of plagioclase and pyroxene content between the two groups. The Yamato suite has more "pigeonitic" pyroxene and less plagioclase and low calcium pyroxene than the Allan Hills suite. Variations within each suite are small and three sections of Allan Hills A78040 are more variable than the Allan Hills suite considered as a group. Modal data provides a basis for pairing polymict eucrite specimens when used together with mineralogical and petrographic criteria. The Yamato suite is tentatively considered to sample three meteorites although further work may reduce this number to two. The Allan Hills suite presently samples two meteorites. Modal data also provides constraints on the petrography of the rock types sampled by these polymict eucrites, and in addition to confirming the presence of several rock types previously identified using pyroxene crystallography, hints at the presence of an augite-rich component. (Auth.)

E-29997

Miura, Y., Smith, D.G.W., Launspach, S., **Ni, Fe, and Co contents of metal phases in the Allende, Holbrook and Nuevo Mercurio chondrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.224-236, 9 refs.

Measurements have been obtained using an automated electron microprobe fitted with both wavelength and energy dispersive spectrometers. The variation patterns of Ni-Fe-Co metal used in this study are discussed from the standpoints of the volume percentage and average composition of each region, and the overall average composition of the metal phases. Co contents of kamacite in these chondrites are inconsistent with those reported previously, but the general tendency of Co to increase in the kamacite in chondrites from H, L to LL groups, is supported by this study. Although the variation patterns of Ni-Co observed so far for L4, H5 and CV3 chondrites are simple, six L6 chondrites, including those reported previously, show significant difference in Co contents and the concentration and abundance characteristics of Ni-Fe-Co patterns of the metal phases. (Auth. mod.)

E-29998

Nagata, T., Masuda, A., Taguchi, I., **Chemical studies on the antarctic iron meteorites, Yamato-790724, ALH-77263 and ALH-77289,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.237-245, 4 refs.

The studies were made from the viewpoint of analytical chemistry. Fourteen elements, Ni, Co, P, As, Au, Cr, Ga, Ge, Ir, Pt, Re, Ru, Sb and W were determined. From the results, Yamato-790724 was classified into Group IIIA. ALH-77236 and ALH-77289 were classified into Group I. The elemental distributions of Ni, Co, P and S in the three meteorites were examined. Phosphide, (Fe, Ni)3P and sulphides, FeS and FeCr2S4, were detected. Morphology of the compounds was observed and their distribution was measured. Some discussions are given to the facet pits formed by the etching method and the orientations. Twinned structures found in ALH-77289 are considered to have been caused by strong mechanical shock. (Auth.)

E-29999

Fireman, E.L., **Carbon-14 terrestrial ages of antarctic meteorites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.246-250, 11 refs.

The carbon-14 terrestrial ages of four Yamato meteorites are measured and compared with the 14C terrestrial ages of eighteen meteorites from Victoria Land. The youngest Yamato meteorite, Y-75102, is 4300 yr; the oldest, Y-74459, is 24,000 yr. The Yamato meteorite site is collecting recent falls, less than 25,000 yr, at a more rapid rate than the Victoria Land sites. (Auth.)

E-30000

Ninagawa, K., Miono, S., Yoshida, M., Takaoka, N., **Measurement of terrestrial age of antarctic meteorites by thermoluminescence technique,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.251-258, 8 refs.

The thermoluminescence (TL) of antarctic meteorites was measured. The depth dependence of the TL for some which have fusion crusts was also measured. The heating of the surface material (0-1.5 mm depth) during atmospheric passage is estimated from the fading of the high temperature TL. It is revealed that this atmospheric heating entirely removes the low temperature TL from the surface of a meteorite and the present low temperature TL glow of the surface material is produced by subsequent terrestrial radiation in Antarctica. The terrestrial ages of these meteorites are estimated from the TL of the surface material with an assumption about the Antarctic storage conditions (stored on the surface or buried under the ice sheet). (Auth.)

E-30001

Kaneoka, I., **Investigation of the weathering effect on the Ar-40-Ar-39 ages of antarctic meteorites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.259-274, 18 refs.

Age patterns were compared for the outer and inner portions of two antarctic meteorites: ALH-761, ALH-77288. The results indicate that the oxidized outer portions show anomalously old 40Ar-39Ar ages which exceed 4600 Ma in the intermediate temperature fractions of around 800-1000C. These old 40Ar-39Ar ages are accompanied by the increase of 36Ar, which is regarded to be mostly of atmospheric 36Ar. This might be explained by the incorporation of atmospheric Ar in hematite which was produced from goethite during neutron irradiation. The inner relatively fresh portions show the following plateau ages: ALH-761,64, 4487 Ma; ALH-77288,63, 4497 Ma. (Auth.)

E-30002

Honda, M., Bernatowicz, T.J., Podosek, F.A., **Xe-129-Xe-128 and Ar-40-Ar-39 chronology of two antarctic enstatite meteorites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.275-291, 26 refs.

Xe-129-Xe-128 and Ar-40-Ar-39 analyses have been performed on two antarctic enstatite meteorites, the chondrite Y-691 and the aubrite (enstatite achondrite) ALH-78113. Both meteorites have complex Ar-40-Ar-39 release patterns to which no unambiguous age assignment is possible. Both give apparently satisfactory Xe-129-Xe-128 correlations corresponding to unusual ages. The I-Xe age of the chondrite Y-691 is 16 Ma after Bjurbole, not unusual for chondrites in general but 10 Ma later than previously known ages for enstatite chondrites. The I-Xe age of the aubrite ALH-78113 is 210 Ma after Bjurbole, the latest age (rather than a limit) so far observed by the I-Xe technique, but this age assignment must be considered tentative because of the possibility that it is significantly influenced by terrestrial I contamination. (Auth.)

E-30003

Grady, M.M., Wright, I.P., Fallick, A.E., Pillinger, C.T., **Stable isotopic composition of carbon, nitrogen and hydrogen in some Yamato meteorites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.292-305, 25 refs.

Three carbonaceous chondrites from the Yamato Mountains, Y-790112, Y-790032, Y-790003, were studied by stepwise combustion in order to distinguish different components of carbon, nitrogen and hydrogen on the basis of release temperature and isotopic composition. (Auth.)

E-30004

Onuma, N., Ikeda, Y., Mayeda, T.K., Clayton, R.N., Yanai, K., **Oxygen isotopic composition of petrographically described inclusions from antarctic unequilibrated ordinary chondrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.306-314, 7 refs.

Several inclusions from the Antarctic unequilibrated ordinary chondrites ALH-764(LL3), ALH-77015(L3) and Y-790448(L3) were excavated and their petrography, chemical and oxygen isotopic compositions were determined. The coherent data indicates that precursors of the ordinary chondrites consist of a mixture of two different solid materials. One is a pre-existing solid enriched in albite component and depleted in O-16 component and the other is a solid depleted in albite component and enriched in O-16 component. The latter solid material may be an evaporation residue of the former solid material in an ambient gas. (Auth.)

E-30005

Wooden, J.L., Takeda, H., Nyquist, L.E., Wiesmann, H., Bansal, B., **Sr and Nd isotopic study of five Yamato polymict eucrites and a comparison to other antarctic and ordinary eucrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.315-322, 8 refs.

Sr and Nd isotopic analysis of five Yamato polymict eucrites indicates that these samples formed at about 4.6 Ga ago with initial Sr and Nd ratios essentially the same as the analyzed non-antarctic eucrites. The Yamato eucrites have Sr, Sm, and Nd concentrations that consistently lie among the highest found in eucritic samples. This characteristic identifies these Yamato samples as a closely related group. Comparison between these Yamato samples and other antarctic polymict eucrites clearly establishes that they all share some characteristic trace element features. Comparisons of antarctic polymict eucrites with non-antarctic ordinary eucrites reveal consistent differences. The most obvious is an enrichment of Rb in the polymict eucrites. These comparisons suggest that the antarctic polymict eucrites belong to a single large family of material that is itself fairly diverse and distinct from the non-antarctic eucrites. (Auth.)

E-30006

Nakamura, N., Tatsumoto, M., Coffrant, D., **Sm-Nd isotopic systematics and REE abundance studies of the ALH-765 eucrite,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.323-331, 27 refs.

Analyses of Sm-Nd systematics and REE concentrations were carried out for the whole rock and mineral separates from the ALH-765 meteorite. A Sm-Nd age of 4.52 b.y. and an initial Nd-143/Nd-144 ratio of 0.50675 have been re-examined in this work. The large Ce anomalies and some minor Sm-Nd system disturbances observed for the meteorite may be interpreted as results of terrestrial weathering effects. (Auth. mod.)

E-30007

Nishimura, H., Okano, J., **SIMS measurement of magnesium isotopic ratios in ALH-77278 and -77307 chondrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.332-340, 14 refs.

Isotopic ratios of Mg-24/Mg-25 and Mg-26/Mg-25 have been measured for Mg-rich and Al-poor portions of matrix areas of ALH-77278 and -77307 meteorites by ion microprobe mass spectrometry. The magnesium isotopic ratios for the meteorites were compared with that for a terrestrial forsterite of laboratory standard. Clear excesses of Mg-24 up to 10 permill have been found for the portions where concentration ratio of Al/Mg was less than 0.1 and that of Mg/Si was between 1.8 and 2.2. (Auth.)

E-30008

Shimizu, H., Masuda, A., Tanaka, T., **Cerium anomaly in REE pattern of antarctic eucrite,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.341-348, 22 refs.

To examine the weathering effect, abundances of rare-earth elements (REE), Ba and Sr and contents of major elements (MgO, FeO, CaO, MnO and Na2O) were determined for inner and outer parts of the ALH-78132 antarctic eucrite. It was observed that the inner part of this eucrite showed a negative Ce anomaly, while all of the outer part specimens displayed positive Ce anomalies. On the other hand, contents of MgO, FeO and CaO for the outer part of the eucrite were similar to those for the inner part of the eucrite. These results and various isotopic ratios between Ce, Nd, Sm, and La suggest strongly that the positive Ce anomaly of the antarctic eucrite is a result of terrestrial weathering. (Auth. mod.)

E-30009

Nagao, K., Ogata, K., Takaoka, N., Saito, K., **Rare gas studies of sixteen stony meteorites from Antarctica,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.349-361, 23 refs.

The concentrations of rare gases and isotopic compositions of He, Ne and Ar were determined for fourteen chondrites and two achondrites from Antarctica. The Xe isotopic ratios were also determined for seven meteorites. Cosmic-ray exposure and gas retention ages are given. Exposure age of 55 Ma determined for Y-75015 eucrite is longer than those for most eucrites so far reported. Xe contained in chondrites is a mixture of cosmogenic and trapped components. Xe-129 excess from extinct I-129 was found for these chondrites. In Y-75015 eucrite, trapped and cosmogenic Xe's were dominant and an appreciable amount of fissiogenic Xe was detected. Five groups of paired meteorites are suggested on the basis of rare gas data. (Auth.)

E-30010

Yu, Z., Chang, S., Kumazawa, M., Fukumoto, M., Yamamoto, A., **Presence of periodicity in meteorite falls,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.362-366, 9 refs.

A maximum entropy method (MEM) spectral analysis is made of the number of historically recorded meteorite falls in China from AD 619 to 1943 and the number of witnessed falls in the world during the period from 1800 to 1974. The presence of a 60 year periodicity as suggested by previous workers, Chang and Yu, is confirmed as a common feature of meteorite fall rate and is determined to be between 60 and 63 years. A periodicity of 240 years, also previously noted, is unstable in spectral analysis, suggesting that this periodicity may not exist. The presence of two more periodic components: about 10.6 years and about 17.7 years in meteorite flux is indicated from the power spectrum. (Auth.)

E-30011

Miyamoto, M., Kinoshita, M., Takano, Y., **Spectral reflectance (0.25-2.5 micrometers) of olivine and pyroxene from an ordinary chondrite,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.367-377, 22 refs.

Diffuse reflectance spectra of olivine and pyroxene from the ALH-769 ordinary chondrite (L6) were measured. The systematic variations of the spectral reflectances of olivine-pyroxene mixtures were examined. Spectral reflectances for olivine and pyroxene were also measured from the olivine sand in Hanauma Bay, Hawaii for comparison. The spectral feature of the pyroxene around 1.25 microns is sensitive to the existence of the small amount of olivine. (Auth. mod.)

E-30012

Lang, B., Grodziński, A., Stoch, L., **Thermoanalytical curves for Yamato-74013 and -74010 diogenites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.378-388, 19 refs.

Within a thermoanalytical study of a number of meteorites were obtained differential thermal (DTA) and thermogravimetric (TG) curves for the Yamato-74013 and -74010 diogenites. Small lithic fragments (blebs) and fines were taken for samples, occasionally weathered. Heating both in air and oxidation-suppressing in Ar was applied up to 1200 C, but the interval not exceeding 700 C appeared relevant for analysis. The thermoanalytical data were tabulated. The major features on the DTA-curves were found to originate from oxidation of troilite to pyrrhotite and magnetite, being followed by further partial oxidation of magnetite to maghemite and hematite. Consistence was shown of the thermoanalytical and thermomagnetic data, while possible interference of thermal effects with magnetic properties of minerals is hypothesized. The similarity of the thermoanalytical curves for both diogenites examined supports the view that they came from a single fall. (Auth.)

E-30013

Fujii, N., Ito, K., Miyamoto, M., Hamano, Y., **Shape of Fe-Ni grains and magnetic susceptibility anisotropy in antarctic chondrites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.389-402, 27 refs.

Magnetic susceptibility anisotropy appears to be low for LL chondrites and seems to bear no correlation with porosity and petrologic types among H and L chondrites. Both prolate and oblate susceptibility ellipsoids are obtained. To characterize the shape irregularity of metallic grains, the Fourier descriptors representation with an arc-length coordinate system is introduced for two-dimensional outline of grains. Unlike the normally used polar coordinate system, this method is applicable to any complicated shape of grain boundary. Some advantages of the present method are demonstrated for several selected Fe-Ni grains from the same specimens as those used for the magnetic and the strength measurements. Newly proposed parameters representing deviations from circular and elliptical shapes are shown to distinguish different complex outlines of Fe-Ni grains. (Auth.)

E-30014

Nagata, T., Funaki, M., Dunn, J.R., **Shock remanent magnetization of meteorites,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.435-446, 8 refs.

Isothermal remanent magnetization (IRM), the shock remanent magnetization (SRM) and IRM with an advance shock acquired in a magnetic field H and with a shock momentum S, are experimentally examined for two stony meteorites, Yamato-75097 L4 chondrite and Jilin H chondrite. Just as in the case of terrestrial igneous rocks, stony meteorites can acquire the characteristic magnetizations in a small magnetic field and a large value of S. Both chondrites have the same anisotropic characteristics as their magnetic susceptibility. (Auth. mod.)

E-30015

Momose, K., Nagai, H., **Application of thermomagnetic properties of Fe-Ni alloys to the thermal history of the Y-74646 chondrite,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.447-451, 5 refs.

The thermomagnetic curves of Y-74646 chondrite have been measured, and to analyze these results, the magnetic properties of 29 at% Ni-Fe alloys have been studied. Comparing and alayzing the experimental results, the thermal history of Y-74646 chondrite is presumed as either of the following: (1) the chondrite has never been exposed to temperature above 600 C. (2) If it had been heated above 600 C, the chondrite was cooled below -193 C after heating. (Auth.)

E-30016

Murae, T., Takahashi, T., Masuda, A., **Organic components in carbonaceous chondrite ALH-77307,51,** *Tokyo. National Institute for Polar Research. Memoirs,* Dec. 1983 Special issue No.30, Symposium on Antarctic Meteorites, 8th, Proceedings, edited by T. Nagata, p.452-455, 8 refs.

The chemical analysis is explained with diagrams showing the steps of the processes and results of gas chromatography and mass spectrometry procedures.

E-30021

Baksi, A.K., **K-Ar dating of altered rocks; the possibility of reaching erroneous geological conclusions,** *Geophysical research bulletin,* Oct. 1973 11(4), p.281-284, 13 refs.

DLC QE500.H9

Eight whole-rock samples from the island of Kerguelen, southern Indian Ocean, have been dated by the K-Ar method. Four of these specimens, which did not meet the thin-section criteria as being suitable for whole-rock dating, were used because of the stratigraphic control available; all of these yielded low ages. Fortuitous agreement between some of these incorrect results could lead to spurious geological conclusions about the phases of igneous activity on the island. Only those samples passing strict thin section criteria should be dated by the K-Ar method, so as to avoid obtaining ambiguous ages. (Auth.)

E-30029

Mahoney, J.J., Macdougall, J.D., Lugmair, G.W., Gopalan, K., **Kerguelen hotspot source for Rajmahal Traps and Ninetyeast Ridge,** *Nature,* June 2, 1983 303(5916), p.385-389, 35 refs.

DLC Q1.N2

The hypothesis that hotspots are the sources of many continental flood basalts is evaluated geochemically for the proposed Rajmahal Traps-Ninetyeast Ridge-Kerguelen hotspot system. It appears that the Kerguelen hotspot did not directly feed Rajmahal magmas, although it may have provided a source of heat for Rajmahal activity. (Auth.)

E-30030

Sheraton, J.W., Black, L.P., **Geochemistry and geochronology of Proterozoic tholeiite dykes of East Antarctica: evidence for mantle metasomatism,** *Contributions to mineralogy and petrology,* 1981 78(3), p.305-317, Refs. p.316-317.

DLC QE351.H45

Two episodes of tholeiite dyke emplacement have been identified in Archaean high-grade metamorphics of the Napier Complex in Enderby Land. Middle Proterozoic Amundsen dykes are typical continental tholeiites and most of the chemical variation in individual suites can be explained in terms of different degrees of partial melting and low-pressure crystal fractionation. Early Proterozoic tholeiites were emplaced at considerable depths in the crust during the waning stages of granulite-facies metamorphism and include a high-Mg suite of possible komatiitic affinity, ranging in composition from by persthene-rich tholeiite (norite) to quartz-rich tholeiite. They tend to have higher ratios of highly to moderately incompatible elements, and larger Nb anomalies compared with middle Proterozoic tholeiites, suggesting derivation from more enriched source regions. (Auth.)

E-30056

Bogorodskiĭ, V.V., Trepov, G.V., Sheremt'ev, A.N., **Study of subglacial lake in the region of the Molodezhnaya Station,** *Soviet meteorology and hydrology,* Aug. 1977 No.8, p.22-25, 4 refs. For Russian original see 32-2567, or 10E-19796.

Results of radio echo sounding of a lake in Antarctica near Molodezhnaya are discussed. It is found that the lake extends under the glacier farther than previous maps had indicated. Drilling confirmed radio echo soundings.

E-30071

Karoly, D.J., **Eliassen-Palm cross sections for the Northern and Southern Hemispheres,** *Journal of the atmospheric sciences,* Jan. 1982 p.178-182, 7 refs.

Eliassen-Palm cross sections and residual meriodional circulations are presented for the Northern and Southern Hemispheres for summer and winter based on 1972-1974 data of Newell. The cross sections are similar to those presented in 1980 for the Northern Hemisphere except that, in the Southern Hemisphere, there is much less variation between summer and winter than in the Northern Hemisphere. (Auth.)

E-30086

Akademie der Wissenschaften der DDR. Zentralinstitut für Physik der Erde, **Report on the workshop "Contributions of the German Democratic Republic to antarctic geological research (1973-1983)"** [Bericht über ein Arbeitstreffen "Beiträge der Deutschen Demokratischen Republik an der geologischen Erforschung Antarktikas (1973-1983)"], Potsdam, 1984, 28p., In German.

The workshop convened in Freiberg in early May 1983 and heard reports on results and problems as viewed by scientists who participated in antarctic research during Soviet Antarctic Expeditions. Locales for the investigations included the East Antarctic ice sheet, the Transantarctic Mountains, and the Antarctic Peninsula. Abstracts are given of the fourteen papers presented at the meeting. Topics covered included: historical mineralogy; mapping the Schirmacher Ponds region; isostasy of the East Antarctic coastal area; tectonics in the Shackleton Range and near Molodezhnaya; relationships between hydrography and tectonics in Queen Maud Land; shelf ice in the Schirmacher area; interpretation of geomagnetic results in Queen Maud Land; geology of the Schirmacher area; dolerites in the Schirmacher region; geological interpretation of aerial photography; microfauna of the Neptune Range; and geological structure of the Latady Mountains.

E-30113

Marsh, P.D., **Stratigraphy and structure of the Lagrange Nunataks, northern Fuchs Dome and Herbert Mountains of the Shackleton Range,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.19-40, 14 refs.

Amphibolite grade supracrustal rocks within the Shackleton Range Metamorphic Complex in the northern part of the range can be correlated with units recognized farther west. They are assigned to two new stratigraphic groups: the Schimper Group, which includes the Nostoc Lake and Mount Gass Formations of the Haskard Highlands; and the Haskard Group, which includes the Williams Ridge Formation. These rocks overlie higher grade gneisses correlated with the Read Complex of the Read Mountains to the south. The two supracrustal groups are not found in contact with each other and it is suggested that they form parts of different large-scale tectonic units. Both groups and the Read Complex were interleaved and attenuated during deformation associated with the formation of the first of two, nearly coaxial, east-west trending fold generations. The metamorphic fabric in the Haskard Group suggests that they did not suffer an early metamorphism detected in the Schimper Group. (Auth.)

E-30114

Bell, C.M., **Geology of islands in southern Bransfield Strait, Antarctic Peninsula,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.41-55, 15 refs.

The oldest rocks on the islands in Bransfield Strait are marine turbidites of probable Upper Palaeozoic or Lower Mesozoic age. These rocks of the Trinity Peninsula Group were deformed and subjected to low-grade metamorphism, possibly as part of a subduction complex, during early Mesozoic times. Unconformably overlying the metasediments are abundant volcanic rocks of the Antarctic Peninsula Volcanic Group. These tuffs and lavas range in composition from rhyolite to basalt. Radiometric age determinations indicate that this complex may in part be early Tertiary in age. Intruded into the volcanic rocks are numerous calc-alkaline plutonic bodies of the 'Andean' suite. This suite has a probable Jurassic to Lower Tertiary age range and together with the volcanic rocks of the Antarctic Peninsula Volcanic Group represents the products of a magmatic island arc. The youngest rocks discussed are late Tertiary olivine-basalt. Evidence of extensive mineralization has been recorded on Intercurrence Island. (Auth.)

E-30129

Shibuya, K., Okayama, M., Terai, K., **Activities of the Japanese party in the McMurdo Sound region, Antarctica, in the 1981-1982 field season,** *Antarctic record,* March 1984 No.81, p.95-101, In Japanese with English summary. 5 refs.

Observation of volcanic earthquakes was carried out on Mount Erebus, Antarctica, by maintaining 3 telemetering seismic stations installed in the 1980-1981 field season. Two telemetering stations were newly installed on the flank of Mount Erebus and on Mount Terror. Observation of magnetic induction loop and infrasound which might be associated with volcanic eruption is also reported. In order to reduce noises in the time signal, the recording-system clock at Scott Base was replaced by an electrically shielded time code generator. Five temporary seismic stations were installed on the flank of Mount Erebus after maintenance of the telemetering system. A dense network of 7-8 stations with an aperture of 5-10 km allows to obtain rather accurate hypocenter parameters of shallow earthquakes with 0-3 km focal depth. (Auth.)

E-30132

Yanai, K., Kizaki, K., Shiraishi, K., Hiroi, Y., Kanisawa, S., **Explanatory text and geological map of Akarui Point and Naga-iwa Rock,** *Tokyo. National Institute of Polar Research. Antarctic geological map series,* Mar. 1984 Sheet 20, 12p. + 5 plates + 1 map, 3 refs.

The geology of Akarui Point and Naga-iwa Rock is discussed in the explanatory text accompanying the map. General geology, petrography of the region, radiometric age of area biotite, chemical composition of rocks exposed, and geologic structure are covered.

E-30133

Nishida, T., Yanai, K., Kojima, H., Matsueda, H., Kanisawa, S., **Explanatory text and geological map of Kasumi Rock, Antarctica,** *Tokyo. National Institute of Polar Research. Antarctic geological map series,* Mar. 1984 Sheet 18, 8p. + 2 plates + 1 map, 7 refs.

The geology of Kasumi Rock is discussed in the explanatory text accompanying the map. General geology, petrography of the region, radiometric age of area biotite, chemical composition of rocks exposed, and geologic structure are covered.

E-30134

Yanai, K., **Explanatory text and locality map of Yamato-69, Yamato-73, Yamato-74 and Yamato-75 meteorites,** *Tokyo. National Institute of Polar Research. Locality map series of antarctic meteorites,* July 1983 Sheet 2, 25p. + map, 7 refs.

The localities of 991 antarctic meteorites which were collected in the Yamato Mountains area in East Queen Maud Land are shown on a map by 10 size classes and type, and listed in an appendix to the explanatory text accompanying the map.

E-30135

Burn, R.W., **Geology of the LeMay Group, Alexander Island,** *British Antarctic Survey. Scientific reports,* 1984 No.109, 65p., Refs. p.61-64.

The LeMay Group of Alexander Island is discussed from the following points of interest: sedimentology, sedimentary petrology, pillow lavas and associated rocks, geochemistry, metamorphism, and structure. It is concluded that the LeMay Group constitutes an important part of the evidence for a late Palaeozoic-early Mesozoic arc-trench system along the Pacific margin of Gondwana.

E-30136

Behrendt, J.C., ed, **Petroleum and mineral resources of Antarctica,** *U.S. Geological Survey. Circular,* 1983 No.909, 75p., Refs. passim. For individual papers see E-30137 through E-30139.

This publication consists of three reports. The first report summarizes the information relevant to petroleum resources in Antarctica and the surrounding seas; the second reviews the reported occurrences of minerals in Antarctica and discusses their significance; the third discusses the Dufek layered mafic intrusion as a potential target for mineral exploration.

E-30137

Behrendt, J.C., **Are there petroleum resources in Antarctica,** *U.S. Geological Survey. Circular,* 1983 No.909, Petroleum and mineral resources in Antarctica. Edited by J.C. Behrendt, p.3-24, Refs. p.23-24.

Some of the available information on potential petroleum resources in Antarctica is discussed. It is concluded that the most probable areas for petroleum resources are those bordering the Ross, Amundsen, Bellingshausen, and Weddell seas in West Antarctica, and the Amery Ice Shelf in East Antarctica.

E-30138

Rowley, P.D., Williams, P.L., Pride, D.E., **Mineral occurrences of Antarctica,** *U.S. Geological Survey. Circular,* 1983 No.909, Petroleum and mineral resources in Antarctica. Edited by J.C. Behrendt, p.25-49, Refs. p.43-49.

Extensive literature relating to metallic and nonmetallic minerals widely spread throughout most of Antarctica is reviewed. Mineral concentrations are found in Precambrian rocks, in rocks of the Beacon Supergroup of East Antarctica, and in Mesozoic and Cenozoic rocks of the Antarctic Peninsula.

E-30139

Ford, A.B., **Dufek intrusion of Antarctica and a survey of its minor metals and possible resources,** *U.S. Geological Survey. Circular,* 1983 No.909, Petroleum and mineral resources in Antarctica. Edited J.C. Behrendt, p.51-75, Refs. p.73-75.

This report describes the Dufek intrusion and a variety of resources that might occur in its various parts. Speculative resources of the Dufek intrusion, based on analysis of selected minor metals in a reconnaissance suite of 24 mostly typical-appearing rocks and on comparison with similar intrusions that contain economic deposits, are considered to include chromium, copper, nickel, vanadium, titanium, iron, and platinum-group metals.

E-30144

Powell, R.D., **Glacimarine processes and inductive lithofacies modelling of ice shelf and tidewater glacier sediments based on Quaternary examples,** *Marine geology,* May 1984 57(1-4), p.1-52, Refs. p.40-52.

Using, in different combinations, three variables that control the type of glacial debris source, and the time and the place of its entering an ocean, eight glacimarine regimes are postulated to exist. Variables that influence glacimarine sediment accumulation from polar to temperate areas are tabulated. It is shown that deposition areas and time periods are not directly comparable, but that the size of drainage basins biases in favor of Antarctica.

E-30145

Elverhöi, A., **Glacigenic and associated marine sediments in the Weddell Sea, fjords of Spitsbergen and the Barents Sea: a review,** *Marine geology,* May 1984 57(1-4), p.53-88, Refs. p.84-88.

Studies of glacigenic and associated marine sediments in the Weddell Sea, fjords of Spitsbergen and Barents Sea show that during periods of limited glacial coverage large amounts of material may be brought into the sea, mainly by meltwater. The major load is deposited relatively close to the icefront. At times of maximum glacial extent, grounded ice extends onto the shelf with the shelf edge as the outer limit, and land and inner shelf areas are eroded. The sedimentary environment outside an ice shelf is characterized by low clastic supply, mainly deposited from icebergs. Due to low turbidity and a supply of nutrient-rich water, biogenic matter accumulates, leading to a glaciomarine sequence rich in bioclastics. Sea-level lowering results in grounding and seaward expansion of the ice shelf. Subsequent eustatic rise causes the grounded ice to float. Deglaciation and sea-level rise reduces clastic input to the shelves. Glacial sediments are reworked, and carbonates may accumulate, forming tillite-carbonate sequence. (Auth.)

E-30146

Anderson, J.B., Brake, C.F., Myers, N.C., **Sedimentation on the Ross Sea continental shelf, Antarctica,** *Marine geology,* May 1984 57(1-4), p.295-333, Refs. p.330-333.

Glacial marine sedimentation has prevailed throughout most of the early glacial history of the Ross Sea region; however, since late Miocene to Early Pliocene time the West Antarctic Ice Sheet has advanced onto the continental shelf, perhaps several times. Glacial troughs of the western Ross Sea may also have formed at this time. Modern glacial sediment is far less prevalent than biogenic sediment and reworked glacial sediment, except in coastal areas adjacent to small ice shelves and ice tongues. Little or no debris is being transported beyond the calving line of the Ross Ice Shelf. Siliceous mud and ooze occurs in the western Ross Sea where surface circulation is most vigorous and warm deep waters upwell. This siliceous sediment, along with terrigenous silt and clay, blankets the seafloor below approximately 300 m water depth; most of the Ross Sea continental shelf is deeper than this. Surface sediments on shallow banks and coastal platforms have clearly been reworked by marine currents. The most vigorous bottom current activity occurs in areas where geostrophic currents impinge on the shelf. (Auth.)

E-30149

Bradshaw, M.A., Newman, J., Aitchison, J.C., **Preliminary geological results of the 1983-1984 Ohio Range expedition,** *New Zealand antarctic record,* 1984 5(3), p.1-17, 16 refs.

A detailed study of the Late Paleozoic sedimentary sequence of the Ohio Range is reported. From a total of 9 recognized lithofacies, some containing well preserved trace fossils, it is concluded that Mt. Glossopteris Formation is a regressive sequence exhibiting a full spectrum of lithofacies from shallow marine to fluvial. Horlick Formation, Buckeye Diamictite, and Discovery Ridge Formation are earmarked for further palynological studies.

E-30150

Weaver, S.D., Bradshaw, J.D., Laird, M.G., **Lawrence Peaks volcanics, North Victoria Land,** *New Zealand antarctic record,* 1984 5(3), p.18-22, 6 refs.

Lawrence Peaks and Mt. Anankiwa volcanic rock analyses show a moderate to high-K, calc-alkaline series of andesites, dacites and rhyolites in which silicic rocks are volumetrically dominant.

E-30152

Gilbert, G.E., Casella, V.R., Bishop, C.T., **Activities of isotopes of uranium, thorium, radium, and lead of antarctic coals,** Columbus, Ohio State University, June 1984, 9p., MLM-3151, 10 refs.

Five coal samples from the Transantarctic Mountains of Antarctica were analyzed for the primordial radionuclides uranium-238, thorium-232, and uranium-235, the parents of the naturally occurring uranium, thorium, and actinium disintegration series, respectively. In most of the samples, the radionuclides uranium-234, thorium-230, radium-226, and lead-210 of the uranium series and radium-228 and thorium-228 of the thorium series were also measured and found to be in secular equilibrium with their parents. Activities of uranium-238, thorium-232, and uranium-235 ranged from about 0.1 to 1.0 pCi/g, 0.09 to 1.1 pCi/g, and 0.006 to 0.06 pCi/g, respectively. These results are comparable to corresponding activities reported for United States coals. (Auth.)

E-30158

Marvin, U.B., **Mineralogical investigations of lunar samples and meteorites. Semiannual progress report, Feb. 1 to Jul. 31, 1983,** *National Aeronautics and Space Administration. Contractor report,* Nov. 1983 NASA-CR-173246, 8p., 4 refs.

Apollo 16 breccia 67015, lunar meteorite Allan Hills 81005, antarctic meteorite pairing and the concentration mechanism, and meteoritic zircon, are analyzed. Initial results of Apollo 16 breccia analysis indicate intense enough magnetization to require the study of individual oriented clasts. Breccia 67015 contains clasts of dark, vesicular KREEP-rich melt rock of VHA composition. Allan Hills 81005 is characterized as a glass-welded soil breccia, plagioclase-rich and KREEP-poor, from the lunar highlands.

E-30159

Fireman, E.L., **Radioactivities in returned lunar materials and in meteorites. Semiannual progress report, Aug. 1, 1983 to Jan. 31, 1984,** *National Aeronautics and Space Administration. Contractor report,* Jan. 1984 NASA-CR-175347, 23p., 19 refs.

Carbon 14 terrestrial ages were determined with low level minicomputers and accelerator mass spectrometry for 1 Yamato and 18 Allan Hills and nearby sited meteorites. The Yamato sample was the youngest antarctic meteorite. Low-level minicounter C-14 results for three additional Yamato and five additional ALHA meteorites are reported. Techniques for an accelerator mass spectrometer which make C(14) measurements on small samples were developed. Also Be(10) concentrations were measured in Byrd core and Allan Hills ice samples.

E-30177

Cook, R.A., Davey, F.J., **Hydrocarbon exploration of the basins of the Ross Sea, Antarctica, from modelling of the geophysical data,** *Journal of petroleum geology,* Apr. 1984 7(2), p.213-226, Refs. p.223-225.

Modelling of geophysical and geochemical history of the Ross Sea basins shows areas where the conditions for hydrocarbon generation should be present. Three major basins are identified: the Eastern Basin, the Central Trough and the Victoria Land Basin. Their locations are mapped. The Eastern Basin has good modelled potential and shows; the Victoria Land Basin has only a good modelled potential, and the Central Trough, where shows have been recorded, has a modelled potential which is barely marginal.

E-30193

Birkenmajer, K., Narebski, W., **Tertiary calc-alkaline island-arc volcanic suite of the South Shetland Islands (West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1980 28(4), p.291-302, With Russian summary. 31 refs.

DLC QE1.P5

The tertiary stratiform volcanic complex (King George Island Supergroup) and the succeeding intrusives (Admiralty Bay Group) of the South Shetland Islands represent a specific calc-alkaline island-arc suite in which lavas predominate over pyroclastics. Three subduction-controlled volcanic cycles related to successive stages of Pacific oceanic-crust consumption in the South Shetland Trench have been distinguished. The cycles usually start with widespread basaltic andesite lava flows related to intra-arc fracturing, being succeeded by stratovolcanic sequences of cumulative high-Al basalts and andesites. The cycles are terminating with residual rhyolite-dacite products of restricted significance. (Auth.)

E-30197

Geological Society of America, **1980 annual meetings,** *Geological Society of America. Abstracts with programs,* Aug. 1980 12(7), p.314-564, Abstracts.

This volume contains the program and abstracts of papers presented at the 93rd annual meeting of the Geological Society of America and its associated societies. General information, a chronological outline of the program, special events, a detailed technical program, the calendar of technical sessions, and an index of authors are included. Abstracts of papers pertinent to the Antarctic appear on p.379, 403, 406, 410, 415, 442, 460, 467, 469, 541, and 553.

E-30198

Geological Society of America, **1982 annual meetings,** *Geological Society of America. Abstracts with programs,* Aug. 1982 14(7), p.364-668, Abstracts.

This volume contains the program and abstracts of papers presented at the 95th annual meeting of the Geological Society of America and its associated societies. General information, a chronological outline of the program, special events, a detailed technical program, the calendar of technical sessions, and an index of authors are included. Abstracts of papers pertinent to the Antarctic appear on p. 440, 466, 468, 476, 478, 490, 558, 581, 592, 605, 615, 624, 637, 643, and 650.

E-30200

Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol. 7 No. 2, July 1984: Partial list of antarctic meteorite classifications by year,** Houston, Texas, NASA Johnson Space Center, 1984, 29p. N84-28714.

This newsletter lists the recently classified meteorites that have not been previously announced. The less common types of meteorites are described on data sheets, in addition to the tabulated information. Sample number, weight in grams, classification, weathering, fracturing, %Fa, and %Fs are shown.

E-30205

Birkenmajer, K., **Raised marine features and glacial history in the vicinity of H. Arctowski Station, King George Island (South Shetland Islands, West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1981 29(2), p.109-117, With Russian summary. 11 refs.

DLC QE1.P5

Holocene and Pleistocene successions of raised marine features have been distinguished in the vicinity of the H. Arctowski Station at Admiralty Bay, King George Island. The Holocene succession of raised marine beaches and cliffs (2-65 m above the sea) is separated from high raised marine beaches (105-255 m a.s.l.) by a residual moraine which correlates with a late-Pleistocene glaciation (Warszawa Glaciation). The high raised marine beaches had formed during non-glacial (Interglacial) intervals of Pleistocene age. The lower group (105-130 m) corresponds to a younger interval (Ubocz Interglacial), and the upper group (180-255 m) to an older interval (Kasprowy Interglacial). Three late-Holocene glacier advances have been distinguished in the vicinity of the H. Arctowski station. (Auth.)

E-30206

Birkenmajer, K., **Lichenometric dating of raised marine beaches at Admiralty Bay, King George Island (South Shetland Islands, West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1981 29(2), p.119-127, With Russian summary. 9 refs.

DLC QE1.P5

The lichenometric dating method, using slow-growing lichen *Rhizocarpon geographicum,* has been applied to raised marine beaches at Admiralty Bay, King George Island. It appears that this method is less reliable for dating unstable habitats of flat raised marine beaches than for morainic ridges and other, morphologically well-separated forms. Two new lichenometrically dated glacial events, dated at about 1780 (Red Corrie Glacial Event) and about 1825 (Loggia Corrie Glacial Event) have been distinguished. (Auth.)

E-30207

Birkenmajer, K., **Pre-quaternary fossiliferous glacio-marine deposits at Cape Melville, King George Island (South Shetlands, West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1981 29(4), p.331-340, With Russian summary. 14 refs.

DLC QE1.P5

Fossiliferous glacio-marine deposits underlain by basalt lavas have been recognized at Cape Melville, King George Island. They represent the Moby Dick Group subdivided into the Sherratt Bay Formation (lower unit: olivine-augite basalt lavas), the Destruction Bay Formation (middle unit: reworked basalts and tuffs with marine fauna—inner shelf environment), and the Cape Melville Formation (upper unit: fine clastics with ice-rafted blocks, with rich marine fauna —outer shelf environment). The glacio-marine deposits in question and their fauna are different from those of the Polonez Glaciation deposits (Pliocene), and have been formed during a pre-Pliocene glacial epoch called the Melville Glaciation. The age of this glaciation is yet to be solved after elaboration of rich and diversified fauna: it is either late Cretaceous or Tertiary. (Auth.)

E-30208

Birkenmajer, K., **Structural evolution of the Melville Peak volcano, King George Island (South Shetland Islands, West Antarctica),** *Polska Akademia Nauk. Bulletin. Série des sciences de la terre,* 1981 29(4), p.341-351, With Russian summary. 10 refs.

DLC QE1.P5

The Melville Peak volcano, 549 m high, is an extinct Quaternary stratocone situated on the insular shelf of the South Shetland Islands, at the northern margin of the Bransfield Rift. Two phases of stratocone formation, belonging to the Penguin Island Group, have been distinguished: the first phase is represented by black basaltic lava flows alternating with yellow pyroclastics and grey lapilli tuffs of the main stratocone, with vent plugged by grey olivine-basalt, and with a dyke cutting through the side of the cone; the second phase produced red pyroclastic breccias and scoriaceous basaltic lava. (Auth.)

E-30221

Himmelberg, G.R., Ford, A.B., Composite inclusion of olivine gabbro and calc-silicate rock in the Dufek Intrusion, **Composite inclusion of olivine gabbro and calc-silicate rock in the Dufek Intrusion, a possible fragment of a concealed contact zone,** *Antarctic journal of the United States,* 1983 18(5), p.1-4, 16 refs.

Among many different types of inclusions in the layered gabbros of the Dufek Intrusion, one of the most interesting is an unusual composite inclusion of olivine gabbro and calc-silicate rock from the lower exposed part of this Jurassic igneous complex. The calc-silicate rock part, possibly derived from the country rock Cambrian Nelson Limestone, consists of clinopyroxene (fassaite), spinel, and minor vesuvianite and other minerals, an assemblage similar to those in metacarbonate inclusions in the Bushveld Complex. The gabbro part consists of augite, orthopyroxene, olivine (Fo59), and plagioclase (An65). The inclusion may have been derived from a hidden contact zone of the intrusion. The presence of olivine, a mineral not occurring as a cumulus phase in exposed rocks, may be significant, because it suggests the mineral might be a member of the crystallization sequence of the Dufek magma and that would indicate the possible presence of olivine-bearing mafic and ultramafic rock in the concealed basal part of the intrusion.

E-30222

Ford, A.B., **Minor-metal reconnaissance survey related to possible resources in the Dufek Intrusion,** *Antarctic journal of the United States,* 1983 18(5), p.4-6, 18 refs.

Chemical analysis of a reconnaissance suite of 24 samples of gabbro, pyroxenite, anorthosite, and granophyre from the layered mafic Dufek intrusion shows that copper, vanadium, titanium, sulfur, and probably cobalt, platinum, and palladium were enriched, and chromium and nickel depleted, during differentiation stages represented by exposed rocks. Element concentrations are similar to those in comparable parts of other layered intrusions. Maximum concentrations of platinum-group elements determined are 35 ppb (parts per billion) platinum, 44 ppb palladium, and 12 ppb rhodium. Correlation studies show that vanadium might be a useful pathfinder element in geochemical exploration for the platinum-group metals in exposed parts of the body. The 1.8-3.5 km-thick concealed basal zone is probably of chief interest for resources such as platinum-group metals, copper, chromium, and nickel.

E-30223

Grew, E.S., Manton, W.I., **Geochronologic studies in East Antarctica: reconnaissance uranium/thorium/lead data from rocks in the Schirmacher Hills and Mount Stinear,** *Antarctic journal of the United States,* 1983 18(5), p.6-8, 6 refs.

Uranium/thorium/lead (U/Th/Pb) data are reported on two samples collected in the Schirmacher Hills and one at Mount Stinear in 1973 and 1974. The samples from Schirmacher Hills are 378X, a metamict allonite from pegmatite, and 395B, zircon from a quartzofeldspathic gneiss. The U/Th/Pb data on 378X are concordant and indicate an age near 630 m.y. for crystallization of the allanite and pegmatite. The U/Pb data on 395B are discordant and could be interpreted to indicate crystallization of the zircon roughly 1500 m.y.a. and subsequent lead loss during the amphibolite-facies metamorphism 630 m.y.a. Geochronologic data suggest that the metamorphosed mafic dikes are Late Precambrian in age while the unmetamorphosed mafic dikes are Late Precambrian or Phanerozoic. Sample 544 is a nodule consisting of several metamict yttrium-bearing minerals, collected from a pegmatite in the basement complex at Mount Stinear. One interpretation suggests that the nodule crystallized 850 m.y.a. and subsequently lost lead. Another suggests an age of 2,580 m.y. with later lead loss.

E-30224

Wright, T.O., **Geological investigations of portions of northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.8-9, 6 refs.

Report is made of geological investigations in the Malta Plateau and Handler Ridge areas as part of the 1982-83 West German Antarctic Northern Victoria Land Expedition (GANOVEX-III), based on board the *Polar Queen.* Two field camps were established in the Mariner Glacier area. The purpose of investigations in the Malta Plateau area was to locate the eastern edge of the Bowers Structural Zone. It was confirmed that the Bowers Structural Zone does continue through to the Ross Sea following approximately the same trend as it has inland. Studies in the Handler Ridge area confirmed that the Ridge consists of Robertson Bay Group graywacke and slate. Two limestone blocks incorporated in a 30 m wide contorted zone yielded fossils—pelmatazoan columnals and well-preserved upper Cambrian lower Ordovician trilobites. It is concluded that some of the rocks on Handler Ridge, previously mapped as pre-Cambrian, are at least as young as the Cambrian/Ordovician boundary and that while some similarities exist between the Handler Ridge sequence and the Bowers Supergroup, serious discrepancies prevent definitive correlation.

E-30225

Keys, J.R., McIntosh, W.C., Kyle, P.R., **Volcanic activity of Mount Melbourne, Northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.10-11, 5 refs.

Mount Melbourne is a mildly active alkaline volcano 12 km from the coast of Wood Bay in northern Victoria Land. It is predominantly snow- and ice-covered and trachytes to trachyandesites are the predominant lithologies although basalts are present around the base. Present-day activity is restricted to small areas of warm ground and ice structures built around fumaroles in the summit area. An englacial layer of tephra found approximately 2 km east of the summit caldera is believed to have been deposited by an eruption within the last few hundred years. Warm ground temperatures were measured and ice structure dimensions noted. A constant degree of geothermal activity appears to have persisted for the last 20 years. A cave system in the summit area was explored.

E-30226

Elliot, D.H., Faure, G., Mensing, T.M., Siders, M.A., Haban, M.A., Cherry, E.M., Geological observations on the Kirkpatrick Basalt in the Mesa Range region, **Geological observations on the Kirkpatrick Basalt in the Mesa Range region, northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.11-12, 4 refs.

Stratigraphic sections of Kirkpatrick Basalt in the Mesa Range region were measured at Mills Valley, Mount Ballou, and Mount Mosley on Pain Mesa; on Tabin Mesa; and on Sculpture Mountain. The basal part of the basalt sequence and the contact with underlying rocks were examined at Agate Peak, Mount Fazio, the Exposure Hill area, and in the upper reaches of the Aeronaut Glacier. Observations during this season support the conclusion that there is no compelling evidence for major faulting at the head of the Rennick Glacier between exposure Hill and Vantage Hills. Nevertheless, a fault probably separates Sheehan Mesa from outcrops to the west and significant faulting undoubtedly occurs to the north, along the Rennick Glacier.

E-30227

Mensing, T.M., Jones, L.M., **Petrogenesis of the Kirkpatrick Basalt, Solo Nunatak, northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.12-14, 9 refs.

Anomalously high initial strontium-87/strontium-86 ratios (greater than 0.710) for the Jurassic tholeiites of the Transantarctic Mountains have been well documented. Two petrogenetic models have been proposed to explain the observed isotopic and chemical trends for these rocks: 1) contamination of mantle-derived melts by the assimilation of crustal material (Faure 1981; Hoefs et al 1980) and 2) generation of tholeiites in a heterogeneous mantle (Kyle 1980). The present study extends the work on the Kirkpatrick Basalt to the Solo Nunatak of northern Victoria Land. The results are similar to those obtained for the Ferrar Supergroup elsewhere in the Transantarctic Mountains. Normal differentiation trends as well as elevated initial Sr-87/Sr-86 ratios are observed on variation diagrams for the Solo Nunatak samples. The average initial Sr-87/Sr-86 ratio was calculated from 24 samples to be 0.71083. The results obtained thus far are consistent with the hypothesis of Faure (1981) and Hoefs et al. (1980) that primary magma, generated from a mantle source with an elevated Sr-87/Sr-86 ratio (0.7093) was subsequently contaminated by assimilating crustal material.

E-30228

Jefferson, T.H., Siders, M.A., Haban, M.A., **Jurassic trees engulfed by lavas of the Kirkpatrick Basalt Group, northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.14-16, 13 refs.

Fossil trees preserved in growth position in lavas of the Kirkpatrick Basalt Group were discovered in the Mesa Range area of northern Victoria Land during the 1981-82 and 1982-83 field seasons. Trunks range from 0.5 to 1 m in diameter and up to 4 m or more in height. In well-preserved wood, the cell wall is composed largely of silica. Secondary mineralization includes abundant coarsely crystalline quartz and banded chalcedony, as well as minor calcite and an abundance of zeolites. All of the wood examined is coniferous and pycnoxylic (composed of tracheids and medullary rays. Poorly defined, widely spaced rings indicate that temperatures and moisture availability were conducive to growth for most of the year. The presence of large, almost continuously growing trees at these latitudes supports evidence from the Permo-Triassic and Lower Cretaceous of Antarctica and the Cretaceous of Australia for the extension of warm, equable conditions into high southern latitudes during the Mesozoic.

E-30229

Stump, E., Holloway, J.R., Borg, S.G., Armstrong, R.L., **Discovery of a Tertiary granite pluton, northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.17-18, 7 refs.

During the 1980-81 field season a Tertiary granite pluton was found exposed for about 5 km along the southwestern side of Mariner Glacier. The mineralogy of the rock is described and rubidium/-strontium (Rb/Sr) data are tabulated. It seems likely that the McMurdo volcanics provided heat for generation of the granite melt, but the source regions for the mafic and silicic magmas may have been distinct (mantle vs lower crust).

E-30230

Rowell, A.J., Cooper, R.A., Jago, J.B., Braddock, P., **Paleontology of the Lower Paleozoic of northern Victoria Land: Brachiopods with Australian and New Zealand affinities in the Spurs Formation,** *Antarctic journal of the United States,* 1983 18(5), p.18-20, 11 refs.

The paleontology of the Bowers Supergroup of northern Victoria Land has been investigated with the objective of collecting fossils that would better constrain the age of the supergroup and its various formations. It is apparent that the rocks are much younger than had been thought. The base of the Sledgers Group is probably Middle Cambrian. The collections from the Spurs Formation, Reilly Ridge, yielded modest samples of phosphatic-shelled inarticulate brachiopods. The fauna is dominated by the acrotretid *Stilpnotreta* cf. *magma* Henderson and MacKinnon but includes specimens of *Treptotreta* sp. and fragmentary *Picnotreta* sp. together with unidentifiable pieces of lingulides. The range of these taxa would date this part of the Spurs Formation from latest Middle Cambrian to middle early Late Cambrian. The brachiopod fauna show strong affinities with that of Australia and New Zealand. A seeming change in the level of endemism from low to high in the Spurs Formation is discussed.

E-30231

Collinson, J.W., Pennington, D.C., Kemp, N.R., **Sedimentary petrology of Permian-Triassic fluvial rocks in Alan Hills, central Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.20-22, 12 refs.

Sedimentologic studies of Permian-Triassic fluvial rocks in Allan Hills were conducted to compare the sequence there with equivalent sequences elsewhere in Victoria Land. Stratigraphic sections of each formation were measured, described and sampled, and more than 750 crossbedding directions were analyzed to determine paleocurrent dispersal. The stratigraphy and lithology of the sequence are described. As noted by Barrett and Kohn (1975; 8E-16750) in southern Victoria Land, the Triassic sequence in the Allan Hills is strikingly similar to the Fremouw and Falla Formations in the central Transantarctic Mountains. This similarity and similarities in dispersal direction suggest that Triassic fluvial systems may have occupied a single elongate depositional basin.

E-30232

Chatterjee, S., Borns, H.W., Jr., Hotton, N., III, **Gondwana rocks of the Allan Hills,** *Antarctic journal of the United States,* 1983 18(5), p.22-24, 7 refs.

The stratigraphy and paleontology of the following sequence of Gondwana rocks in the Victoria Group exposed at Allan Hills are described: 1) Feistmantel Formation (Permian); 2) Weller Formation (Permian), 3) Feather formation (Triassic), 4) Lashly Formation (Triassic), 5) Mawson Formation (Lower Jurassic), and 6) Ferrar Formation. While no vertebrate fossils were found, a comprehensive suite of plant fossils of very high quality was collected, including *Glossopteris, Gangamopteris,* ginkgoales, equistaleans, *Dicroidium,* and pteridosperms.

E-30233

Malin, M.C., **Preliminary abrasion rate observations in Victoria Valley, Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.25-26, 6 refs.

A reconnaissance of the ice-free valleys in South Victoria Land, Antarctica was undertaken during the 1982-1983 field season to select sites for long-term studies of physical and chemical weathering processes and rates. A single, limited duration experiment was conducted to proof-test hardware and deployment techniques. One set of samples was collected after 16 days exposure; a second set will be collected during the 1983-1984 season. The single test site was located at 77 deg 22'30"S, 162 deg 09'30"E in a field of sand dunes east and slightly north of Lake Vida, in lower Victoria Valley. Sand collectors were deployed at 7, 14, 21, 35, 70, and 140 cm height facing north, east, south, and west. Abrasion targets consisting of disks of basalt, nonwelded volcanic tuff, and sandstone were deployed at 7, 14, 21, 35, and 70 cm height, also facing the cardinal directions. Preliminary analysis indicates a maximum abrasion rate of about 3 micrometers/day for the non-welded tuff and 0.7 micrometers/day for the basalt. Better knowledge of the frequency of sand-transporting winds, and observations in areas of significantly lower sand flux, are needed before these rates can be used to assess past environments.

E-30234

Robinson, P.H., Denton, G.H., **Sediment features in the drift of Lake Bonney basin, Taylor Valley,** *Antarctic journal of the United States,* 1983 18(5), p.27-29, 6 refs.

During the 1982-1983 summer field season, as part of a continuing investigation on the glacial history of Taylor Glacier, sites within the surficial drift of Lake Bonney were re-examined. This article reviews the sediment character of the drift surrounding the snout of Taylor Glacier and shores of Lake Bonney. Of particular importance are the nonsorted, terrigenous sediments (diamictons) that are assumed to be deposited directly from ice and thus are valuable for determining the past behavior of Taylor Glacier. The drift forms an almost complete cover to the underlying bedrock in the valley bottom and is composed of laterally variable lithologies. Within the drift, certain facies associations and sediment features are recognized to have analogs in the modern depositional environment along the margin of Taylor Glacier. By comparing features in the drift with similar features in the glacial debris, it may be possible to reconstruct part of the depositional history of the drift in upper Taylor Valley.

E-30235

Elston, D.P., Rieck, H.J., Robinson, P.H., **Dry valleys/McMurdo Sound magnetostratigraphy and sedimentology,** *Antarctic journal of the United States,* 1983 18(5), p.29-31, 4 refs.

Objectives of this international multidisciplinary investigation of the late Cenozoic history of the dry valleys and McMurdo Sound region are to (1) develop a detailed stratigraphy in the near-subsurface, tied to surface exposures, so that the character and extent of incursions of the Ross Ice Sheet into Taylor Valley can be better understood, (2) refine age determinations of the glacigenic sediments by employing polarity and paleontologic information, and (3) tie the subsurface records in Taylor Valley to subsurface records in McMurdo Sound. Information gained by meeting these objectives should lead to a better understanding of the glacial history of southern Victoria Land and the Ross Ice Sheet and should enable scientists to evaluate potential relationships to global changes in sea level and climate. During the 1982-1983 field season, six core holes (ETV-3 to -8; ranging in depth from 10.5 to 58 m were drilled in ice-cemented deposits in eastern Taylor Valley. Additionally, detailed geologic mapping (1:24,000 scale) was begun. Sedimentologic, paleontologic, and paleomagnetic studies of the cores are summarized.

E-30236

McGinnis, L.D., Bowen, R.D., Kreamer, J., **Deep seismic soundings along the boundary between East and West Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.32-34, 3 refs.

Seismic reflection depth soundings were completed during the 1982-83 field season along a profile extending from Hut Point Peninsula on Ross Island to the Strand Moraine on the southern Victoria Land coast. Reflection profiling was accomplished using common-depth-point (CDP) procedures with recording on 24 channels to produce 12-fold stacking. Shots of 4.54 kilograms were placed 50 meters apart at depths 5 meters below the surface of the sea ice. Geophone groups, consisting of six geophones per group, were placed on the sea ice 50 meters apart and recording time was 12 seconds at a 2-millisecond sampling rate. An unmigrated, 12.5-kilometer section of the profile, from preliminary data shot in the 1981-1982 season, is shown and discussed.

E-30237

Wright, A.C., McIntosh, W., Ellerman, P., **Volcanic geology of Turks Head, Tryggve Point, and Minna Bluff southern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.35-36, 4 refs.

The volcanic stratigraphy of the McMurdo Volcanic Group rocks at Turks Head and Tryggve Point on Ross I. and in selected areas at Minna Bluff is described. Turks Head and Tryggve Point form the coast of Ross I. north of the Erebus ice tongue. The sea cliffs bounding these small headlands afford good exposures of two, probably independent, subaqueous to subaerial volcanic sequences in which nepheline hawaiite is the predominant rock type. Intrusion of brecciating dykes into the saturated and unconsolidated subaquagene pile and a proliferation of soft sediment faulting caused disruption of primary structures, which have been further affected by postlithification, high-angle faulting and remobilization of fine palagonitic sediment. The 50-kilometer-long peninsula forming Minna Bluff extends southeast from the flanks of Mount Discovery into the Ross Ice Shelf. It formed as one of three radial arms of volcanic activity associated with crustal doming attributed to magma emplacement beneath Mount Discovery.

E-30238

Stott, L.D., McKelvey, B.C., Harwood, D.M., Webb, P.N., **Revision of the ages of Cenozoic erratics at Mount Discovery and Minna Bluff, McMurdo Sound,** *Antarctic journal of the United States,* 1983 18(5), p.36-38, 6 refs.

McMurdo erratics collected from Minna Bluff and Mount Discovery have been examined and compared petrographically and paleontologically with the 229-m glaciomarine sequence recently drilled in McMurdo Sound. Petrographic similarities between the erratics and the McMurdo Sound Sediment and Tectonic Studies (MSSTS) 1 lithologies together with newly discovered fossil marine diatoms in many of the erratics now make it possible to define more accurately their source and their regional stratigraphic context. The findings are summarized. Seven limestone and clastic erratics contain late Oligocene, late Miocene or Pliocene diatoms. These same erratics also contain Paleogene dinoflagellates. The presence of late Miocene and Pliocene diatoms in the erratics confines the time of submarine erosion by piedmont or grounded shelf ice to some interval in the last 5 m.y.

E-30240

Kienle, J., Marshall, D.L., Kyle, P.R., Kaminuma, K., Shibuya, K., Dibble, R.R., **Volcanic activity and seismicity of Mount Erebus, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.41-44, 8 refs.

Observations of the lava lake at Mount Erebus during the 1982-83 field season showed the pattern of activity to be similar to that observed over the past 6 yr. A permanent, short-period seismic array designed to monitor the long-term seismicity associated with the volcanic activity at Mount Erebus has been in continued operation for 3 yr. The current network of five stations was serviced and upgraded during the 1982-83 field season. Detailed analysis of 162 earthquakes selected from a catalog of 1,000 events recorded during 1981-82 showed two principal distributions of hypocenters which Shibuya et al (in press) call type 1 and type 2 events. The characteristics of the two types of events are given. On Oct. 8, 1982 an unusual earthquake swarm of almost 700 events occurred near Abbott Peak, a station 10 km north-northeast of the summit of Mount Erebus. The locations of the October swarm events are shown and discussed in terms of crustal velocity models.

E-30241

Dreschhoff, G.A.M., Siegel, F.R., Vaz, E., Zeller, E.J., **Field test of thermoluminescence dosimeters for measurement of the natural radiation environment on Ross Island,** *Antarctic journal of the United States,* 1983 18(5), p.45-46.

Tests of the thermoluminescence dosimetry technique were conducted on Ross I. at Observation Hill on Cape Armitage and at Trachyte Hill on Cape Bird to determine its usefulness in evaluating the radiation background in rocks and soils. The equipment used is described and the results of the tests are outlined. Results of the tests indicate that dosimeters can be used to monitor very subtle variations in the radiation environment in rocks and soils of Antarctica. Early emplacement at the beginning of a field season with recovery approximately 3 mo. later should be adequate to provide accurate measurement of the radioactivity of the site.

E-30242

Stump, E., MacCracken, H., **Reconnaissance geological investigation of basement units, McMurdo Sound region,** *Antarctic journal of the United States,* 1983 18(5), p.46-47, 5 refs.

As part of a project to collect representative samples of all units of the pre-Beacon basement complex throughout the McMurdo

Sound region from Granite Harbor to Koettlitz Glacier, samples were collected in Jan. 1983 from the following: the Koettlitz Group in the Koettlitz Glacier area, representatives of the Åsgard Formation in Taylor, Wright, and Victoria Valleys, and a reference sequence in the Wright Valley to which other igneous rocks in the region can be compared. Of note was the recovery of orbicular granite on a moraine near the mouth of Benson Glacier north of Granite Harbor.

E-30243

Dreschhoff, G.A.M., Zeller, E.J., Schmid, H., Bulla, K., Morency, M., Tremblay, A., **Radioactive mineral occurrence at Szabo Bluff, Transantarctic Mountains,** *Antarctic journal of the United States,* 1983 18(5), p.48-49, 1 ref.

In Dec. 1982 a camp was established in the Szabo Bluff area of the Transantarctic Mountains to investigate the occurrence of radioactive minerals first noted by Stump et al (1981; 13E-26736). Primary and secondary radioactive minerals were found in the pegmatite outcrops. The highest concentration of uranium in the dark minerals of the outcrop showed a range in uranium concentrations from 258 to 323 parts per million. The anomalous thorium-to-uranium ratios first detected in the airborne survey were confirmed. The uranium minerals at Szabo Bluff are too limited to be considered a significant resource but are of substantial scientific interest. An expanded search using helicopter support is suggested.

E-30244

Burt, D.M., Stump, E., **Mineralogical investigation of andalusite-rich pegmatites from Szabo Bluff, Scott Glacier area,** *Antarctic journal of the United States,* 1983 18(5), p.49-52, 6 refs.

The coarse-grained biotite granite at Szabo Bluff, Scott Glacier area contains several flattened, pod-like pegmatitic bodies up to 20 m long and 6 m high. Common minerals include quartz, K-feldspar, albite, biotite, muscovite, tourmaline, and ilmenite. The two largest pegmatites in addition contain meter-wide segregations of radiating, reddish-brown andalusite crystals, heavily altered to compact, fine-grained muscovite. Minor alteration products seen in thin section also include tourmaline, dumortierite, and corundum. The growth of andalusite, rather than muscovite or sillimanite, from the pegmatitic melt indicates an extremely restricted range of pressures and temperatures. The subsolidus replacement of andalusite by muscovite plus corundum indicates local silica depletion in late hydrous fluids.

E-30245

Cosgriff, J.W., **Large thecodont reptiles from the Fremouw Formation,** *Antarctic journal of the United States,* 1983 18(5), p.52-55, 17 refs.

Two vertebrate fossil specimens of large thecodont reptiles collected from the Lower Triassic Fremouw Formation in the Cumulus Hills of the Queen Maud Mountains during the 1977-78 season are described. Left humerus specimen WSUVP 1013 was discovered at Shenk Peak and vertebra specimen WSUVP 1097, at Collinson Ridge. Morphologic features of the humerus serve to place this specimen in the Pseudosuchia according to the criteria of Krebs (1965) and relate it most closely with species of the family Rauisuchidae of this suborder. The vertebra shows affinity with proterosuchians. The humerus constitutes the only record anywhere for this interval of a non-proterosuchian thecodont.

E-30246

Jefferson, T.H., Taylor, T.N., **Permian and Triassic woods from the Transantarctic Mountains: Paleoenvironmental indicators,** *Antarctic journal of the United States,* 1983 18(5), p.55-57, 11 refs.

Growth patterns recorded in silicified wood have been examined in material from localities in the Fairchild and Buckley Formations (Permian) and Fremouw and Falla Formations (Triassic), including a large amount of fossil wood from the "permineralized peat" deposit of Mount Augusta at the southern end of the Queen Alexandra Range. The woods were derived from arborescent gymnospermous plants, some of which are estimated to have been in excess of 22 m. Secondary xylem is generally well preserved and is of the *Araucarioxylon* type. The evidence suggests that during the late Permian and early Triassic the southern margin of the antarctic continent experienced summers similar in temperature to those of warm-temperate latitudes today. It is also indicated that drought, fire, and animal damage (and possibly growing-season frosts) were common in the Permo-Triassic forests of Antarctica.

E-30247

Taylor, T.N., Smoot, E.L., **Structurally preserved plants from the Beardmore Glacier area,** *Antarctic journal of the United States,* 1983 18(5), p.57-58, 4 refs.

A preliminary examination of silicified material from the Beardmore Glacier area indicated that the Permian and Triassic fossils are similar to the Pennsylvanian coal ball material in preservation of cellular details. A variety of plant structures representing many of the major groups of plants are present, including various types of fungi, gymnospermous seeds with well-preserved gametophytes, axes representing both underground and aerial parts of *Glossopteris* and associated taxa, fern stems and petioles, cycad axes, and a number of problematic plant remains. In addition to the exceptional quality of the preservation of these plants, the diversity of the flora is excellent and compares favorably with compression floras of similar age.

E-30249

Le Masurier, W.E., Ellerman, P.J., McIntosh, W.C., Wright, A.C., **USCGC *Glacier* cruise I, December 1982-January 1983: Reconnaissance of hyaloclastites in the western Ross Sea region,** *Antarctic journal of the United States,* 1983 18(5), p.60-61, 6 refs.

A field reconnaissance of Cenozoic volcanic rocks from Cape Adare along the Hallett Coast to Beaufort I. was undertaken on board USCGC *Glacier* during the 1982-83 field season. This report focuses on a comparison of western Ross Sea hyaloclastites with similar rocks in Marie Byrd Land. Hyaloclastites in both areas have been interpreted as products of subglacial eruptions. Observations indicate that the volcanoes along the western Ross Sea margin contain a larger proportion of subaerial volcanic rock throughout the section than Hamilton (1972; 6E-10654) envisaged and that this accounts for most of the differences between the Hallett Province volcanoes and the hyaloclastite sections in Marie Byrd Land. It is suggested that the volcanic piles in the Hallett Province and at Franklin and Beaufort Is. represent eruptions that were predominantly periglacial rather than subglacial with alternating episodes of Strombolian, phreatomagmatic, and shallow subglacial activity.

E-30250

Webers, G.F., Splettstoesser, J.F., **Ellsworth Mountains studies, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.62, 4 refs.

Progress in studies of the Ellsworth Mountains during the 1982-83 season are outlined, including the presentation of papers at geological meetings and at the Fourth International Symposium on Antarctic Earth Sciences, held in Australia; a symposium on "The Geology of the Ellsworth Mountains", held in New Orleans; the beginning of a volume on the geology and paleontology of the Ellsworth Mountains, and an annotated bibliography on the area. The first conodonts reported anywhere in Antarctica were found in the Late Cambrian carbonate rocks of the Heritage Range. Forms identified as archaeocyathans have also been discovered in the Late Cambrian of the Range.

E-30251

Askin, R.A., **Campanian palynomorphs from James Ross and Vega Islands, Antarctic Peninsula,** *Antarctic journal of the United States,* 1983 18(5), p.63-64, 5 refs.

Fossil palynomorph assemblages recovered from The Naze, northeastern James Ross Island, and Cape Lamb, Vega Island, northeastern Antarctic Peninsula, are believed to be of Campanian (Late Cretaceous) age. Samples were collected during brief visits by the USCGC *Glacier's* helicopter in March 1982 and include two samples from The Naze and 10 from Cape Lamb. The samples are from the Lopez de Bertodano Formation and include carbonaceous muddy silts and silty muds, plus a siltstone and a silty limestone from Cape Lamb. All 12 samples contain fossil palynomorphs, including marine phytoplankton (dinoflagellate cysts and acritarchs), and pollen and spores from land-plants. The species are identified and discussed. Palynological evidence suggests the Cape Lamb beds are younger than those at The Naze. A near-shore environment of deposition is indicated for the Cape Lamb samples.

E-30252

Zinsmeister, W.J., DeVries, T.J., **Quaternary glacial marine deposits on Seymour Island,** *Antarctic journal of the United States,* 1983 18(5), p.64-65.

During a 1981-82 study of the Upper Eocene La Meseta Formation on Seymour I. at the formation's southeast corner, an outcrop was discovered which clearly shows that erratics on the meseta surface were derived from a previously unrecognized glacial marine deposit (informally referred to here as the Weddell Formation) that caps the top of the meseta. This glacial marine deposit consists of approx 20 m of medium gray, loosely consolidated, poorly sorted, sandy siltstone with numerous dropstones. Although the lower contact of these glacial marine beds with the La Meseta Formation is not well exposed, it is apparent that the Weddell Formation was deposited on an irregular topography with low relief. The similarity in the lithology of the sediments of the Weddell Formation with the upper Eocene La Meseta Formation and lack of good exposures of the Weddell Formation are the primary reasons for these glacial marine beds having been overlooked. Microfossil sampling revealed large numbers of reworked palynomorphs but no diagnostic Neogene taxa.

E-30253

Zinsmeister, W.J., **Unusual periglacial features on Seymour Island, Antarctic Peninsula,** *Antarctic journal of the United States,* 1983 18(5), p.66-67.

Although Seymour I. is free of ice, typical periglacial features such as patterned ground, etc. are absent. One unusual periglacial feature on the island is semipermanent deposits (referred to here as "cryoeolianites," frozen, wind-blown sediments) and associated features. These wind-blown sediments tend to collect on the surface of snow drifts along the protected stream channels, often completely concealing the drift. With each storm the deposits grow and form solid dam-like structures across the streams. Cryoeolianite caves at the base of the deposits play an important role in maintaining cryoeolianitic structures.

E-30254

Zinsmeister, W.J., Macellari, C.E., **Changes in the macrofossil faunas at the end of the cretaceous on Seymour Island, Antarctic Peninsula,** *Antarctic journal of the United States,* 1983 18(5), p.68-69, 2 refs.

The Upper Cretaceous/Lower Paleogene deposits on Seymour I. and adjacent islands in the James Ross I. region of the Antarctic Peninsula represent one of the most complete and well-exposed sequences of that age rock in the Southern Hemisphere. Macrofossils here are abundant and exceptionally well preserved. Macropaleontological evidence and studies support earlier beliefs that a continuous record of deposition from the Late Cretaceous to the earliest Tertiary is present on Seymour I. The behavior of macrofauna in the proximity of the inferred Cretaceous/Tertiary boundary is discussed.

E-30255

Macellari, C.E., Zinsmeister, W.J., **Sedimentology and macropaleontology of the Upper Cretaceous to Paleocene sequence of Seymour Island,** *Antarctic journal of the United States,* 1983 18(5), p.69-71, 6 refs.

Upper Cretaceous to Paleocene marine sediments on Seymour I. have been divided into three lithostratigraphic units (Lopez de Bertodano, Sobral, and Cross Valley Formations) and represent a single regressive sedimentary cycle. The sedimentology and paleontology of the sequence are summarized. The lithology is dominantly composed of grayish sandy siltstones with abundant concretions and concretionary horizons. A striking feature in the lowermost portion of the Lopez de Bertodano Formation is the presence of massive gray mudstone units that can be traced to Snow Hill I. The annelid genus *Rotularia* has proven to be very useful for local correlation. Four different assemblages have been recognized. Three informal ammonite zones, represented by three species of *Pachydiscus,* have been recognized in the area approx 600 m above the base of Lopez de Bertodano Formation and are described. These three species (two of which are reported here for the first time) suggest that probably the uppermost 600 m of the Lopez de Bertodano Formation is Maastrichtian in age.

E-30256

Huber, B.T., Harwood, D.M., Webb, P.N., **Upper Cretaceous microfossil biostratigraphy of Seymour Island, Antarctic Peninsula,** *Antarctic journal of the United States,* 1983 18(5), p.72-74, 22 refs.

During the 1982 Ohio State University expedition to Seymour I., detailed sections in the Upper Cretaceous Lopez de Bertodano Formation were sampled and measured. Approximately 200 samples were collected from three sections, the thickest being 1,460 m. The purpose of this study is to document the microfossil assemblages from this locality and to use these assemblages to develop a biostratigraphic zonation and establish Southern Hemisphere correlations. Foraminifera, calcareous nannoplankton, and diatoms are each treated separately.

E-30257

Wilson, T.J., Dalziel, I.W.D., **Geology of the Ultima Esperanza fold-thrust belt, southernmost Andes,** *Antarctic journal of the United States,* 1983 18(5), p.75-76, 12 refs.

During the austral summers of 1979-1982, stratigraphic mapping was undertaken within the foothills of the southern Patagonian Andes at 51 S latitude, in the Ultima Esperanza district of southern Chile. The foothills belt is part of the foreland fold-thrust belt of the southernmost Andes and includes stratigraphic units to Late Jurassic to Neogene age. The study focused on the sedimentology, stratigraphy, and paleoenvironmental setting of the oldest part of the stratigraphic sequence (including units to Late Jurassic to Late Cretaceous age) and on the structural development of the Ultima Esperanza fold-thrust belt.

E-30258

DeVries, T.J., Zawiskie, J.M., Zinsmeister, W.J., **Expedition to Valdes: Miocene stratigraphy and recent silled basins,** *Antarctic journal of the United States,* 1983 18(5), p.76-78, 1 ref.

A two-phase program of stratigraphic and oceanographic study around Peninsula Valdes (Patagonia, Argentina) was carried out between 4 and 14 Sep. 1981 with the support of R/V *Hero* (Cruise 81-4). Stratigraphic study of the middle to late Miocene Entrerio and Rionego Formations expands upon that of Zinsmeister et al (1981), who concluded that the two formations were conformable and laterally equivalent, recording the progradation of mudflat, beach, and supratidal facies into shallow, offshore, marine environments. The oceanographic program included bathymetric surveys and bottom sampling of the gulfs surrounding Peninsula Valdes.

E-30261

Black, L.P., Fitzgerald, J.D., Harley, S.L., **Pb isotopic composition, colour, and microstructure of monazites from a polymetamorphic rock in Antarctica,** *Contributions to mineralogy and petrology,* 1984 85(2), p.141-148, 22 refs.

A moderate- to high-grade regionally metamorphosed paragneiss from Antarctica contains monazites of several different colors—brown, yellow and grey. Each color type has a distinctive U-Pb isotopic composition which appears to result from different proportions of radiogenic Pb loss. All color types have similar structures at the submicron scale. The grains are composed of crystalline domains misoriented from each other and separated by narrow confused boundary regions where misorientation is probably accommodated by imperfect atomic arrangements. These regions of mismatch form potential zones of high permeability/diffusivity which are believed to be fundamental to the isotopic and color differences between grains. Color type is apparently related to the capacity of different minerals to shield included monazite grains from fluids circulating in the rock system. (Auth. mod.)

E-30262

Ostertag, R., Amthauer, G., Rager, H., McSween, H.Y., Jr., **Fe3+ in shocked olivine crystals of the ALHA 77005 meteorite,** *Earth and planetary science letters,* Feb. 1984 67(2), p.162-166, 22 refs.

The antarctic meteorite ALHA 77005, a shocked achondrite of the shergottite group, is unique in containing cumulus olivine crystals which display a brownish color in thin section. Mössbauer, EPR, and optical spectroscopic studies show the presence of Fe3+ in the olivine. Approximately 4.5 wt.% of the total iron in the olivine is in the trivalent state. The Fe3+ ions preferentially occupy M2 lattice positions. Charge transfer between Fe3+ and Fe2+ as well as between Fe3+ and oxygen ligands causes a broad absorption band in the optical spectrum at high energies which is the reason for the olivine color. It is concluded that the color of the ALHA 77005 olivine is preterrestrial and may be the result of shock-induced oxidation of the olivine crystals on the meteorite parent body. (Auth.)

E-30264

Meteoritical Society, **Abstracts of papers presented at the 46th annual meeting of the Meteoritical Society, Sep. 5-9, 1983, Mainz, FRG,** *Meteoritics,* 1983 18(4), p.260-433.

Twelve of the papers in this collection relate to the Antarctic. They are: Allan Hills meteorite icefield—an alternative view, by J.O. Annexstad et al; Antarctic blue ice fields and the search for meteorites near the Allan hills, by V.F. Buchwald et al; Thiel Mountains, a new area for meteorite collection in Antarctica, by R. Crane et al; Halogens in antarctic meteorites, by G. Dreibus et al; Kr-81 terrestrial ages of antarctic eucrites, by M. Freundel et al; Production rate of cosmogenic Ar-38 in eucrites, by M. Freundel et al; Noble gas chronology of two antarctic enstatite meteorites, by M. Honda et al; Fe3+ in shocked olivine crystals of the ALHA 77005 meteorite, by R. Ostertag et al; Shock induced chemical reactions in Allan Hills achondrite 77005,21, by F.J.M. Rietmeijer; Light noble gases in 15 meteorites, by P. Signer et al; Degree of homogenization of eucrites and their thermal history, by H. Takeda et al; and On the nature of metallic and glassy spherules in antarctic ice, by K. Thiel et al. Substantive abstracts are included for each paper.

E-30274

Tomiyama, C., Kitano, Y., **Calcite formation in calcium chloride rich water,** *Japanese journal of limnology,* Jan. 1984 45(1), p.1-5, 13 refs.

Calcite was found in the sediment of the Don Juan basin in the dry valleys region of Antarctica. In order to clarify the chemical composition of the past pond water, the crystal formation of calcium carbonate from calcium chloride rich solution was studied. The transformation of aragonite into calcite in a calcium chloride solution was also investigated. The experimental results suggest that calcite in the sediments of the Don Juan basin was formed from calcium chloride water through inorganic processes. (Auth.)

E-30275

Sheraton, J.W., Black, L.P., **Geochemistry of Precambrian gneisses: relevance for the evolution of the East Antarctic Shield,** *Lithos,* 1983 16(4), p.273-296.

Archaean granulite-facies orthogneisses of the Napier Complex in Enderby Land, metamorphosed 3070 Ma ago, comprise two chemically distinct suites. The more abundant, mainly of tonalitic to granodioritic composition, shows strong Y depletion, explicable by hydrous partial melting of a garnet-bearing source (garnet amphibolite or possibly eclogite); it apparently represents new continental crust. Other gneisses (predominantly of trondhjemitic to granitic (s.s) composition) do not show Y depletion. They probably originated by relatively dry melting of predominantly felsic crustal rocks. Both suites show evidence for loss of rb (relative to K), Th, and U during metamorphism. Late Archaean (2800 Ma) amphibolite-facies gneisses of MacRobertson Land are of 'undepleted' type and may be representative of a higher crustal level than those of Enderby Land. Late Proterozoic granulite-facies gneisses of Enderby Land (Rayner Complex) are to a large extent remetamorphosed Napier Complex rocks of igneous derivation; in contrast, gneisses of similar age in MacRobertson Land include a much higher proportion derived, either directly or by partial melting, from sedimentary protoliths. (Auth.)

E-30288

Barker, P.F., Barber, P.L., King, E.C., **Early Miocene ridge crest-trench collision on the South Scotia Ridge near 36W,** *Tectonophysics,* Feb. 20, 1984 102(1-4), p.315-332, 38 refs.

Preliminary interpretation of marine geophysical data and geochemical analyses of dredged rocks has led to the identification of a ridge crest-trench collision zone southeast of the South Orkney Islands. The collision zone takes the form of a double ridge with dissecting trough, aligned NE-SW and about 200 km long. Oceanic magnetic lineations in the northern Weddell Sea young northwestward towards the zone, with the youngest reaching the central trough. Volcanics dredged from Jane Bank, the northwestern ridge, are chemically very similar to the more siliceous of the low-K tholeiite series which characterises the presently active South Sandwich arc. Jane Bank is interpreted as an *in situ* remnant of the arc and upper fore-arc of an intra-oceanic arc produced by subduction of South American oceanic lithosphere (like the present South Sandwich Islands). Part of the upper fore-arc and all of any accretionary wedge appear to have been subducted. Unlike ocean floor at collision zones off Chile and the Antarctic Peninsula, the seabed in the trough and on the ridge to the southeast does not conform to the normal oceanic age-depth relationship. The estimated collision time (20 Ma) is close to the time of onset of N-S extension in the Central Scotia Sea. (Auth. mod.)

E-30289

Farrar, E., Dixon, J.M., **Overriding of the Indian-Antarctic Ridge: origin of Emerald Basin and migration of Late Cenozoic volcanism in southern New Zealand and Campbell Plateau,** *Tectonophysics,* May 1, 1984 104(3/4), p.243-256, 40 refs.

Examination of plate reconstructions of the Neogene interactions among the Indian, Antarctic and Pacific plates suggests that the New Zealand and Campbell Plateau portion of the Pacific plate has overridden the site of mantle upwelling formerly associated with the southeastern end of the Indian-Antarctic ridge. The site of mantle upwelling can be projected to have migrated in a fan-shaped pattern from a NNE-SSW trend across South Island, New Zealand, and along the western edge of the Campbell Plateau in Oligocene time to its present position along the southeast continental slope of the Campbell Plateau. This migration has been closely followed by the eruption of alkaline basaltic volcanic rocks which display a similar fan-shaped age distribution, and which we interpret as evidence of the persistence of the mantle upwelling process for tens of millions of years after its overriding by continental lithosphere. The Emerald Basin and Macquarie Ridge complex resulted from "secondary spreading" when overriding of the Indian-Antarctic ridge by the Campbell Plateau juxtaposed the Indian and Pacific plates. (Auth.)

E-30290

Grew, E.S., **Review of antarctic granulite-facies rocks,** *Tectonophysics,* June 1, 1984 105(1-4), p.177-191, 68 refs.

Precambrian granulite-facies rocks occur in significant proportion in the East Antarctic Precambrian shield. Ages of metamorphic and deformational events range from 2500 m.y. to about 500 m.y., but some rocks are much older, notably the approximately 3500 m.y. ages for crust formation in Enderby Land. Mineral assemblages over most of the area are typical of the hornblende granulite facies, and sparse temperature pressure estimates indicate metamorphism at 700-800 C and 5-8 kbar at reduced water pressures. A terrane of exceptional interest is the Napier complex of Enderby Land, where sapphirine-quartz p/m garnet, sillimanite-orthopyroxene, osumilite, and inverted pigeonite are associated with pyroxene-granulite-facies rocks. Metamorphic conditions are estimated to have reached 900-980 C, 7-9 kbar, and water pressure <0.5 kbar. Metamorphism in the Napier complex, and possibly in other parts of East Antarctica, may be associated with large loss of fluid rather than massive influx of CO2. (Auth.)

E-30292

Wacker, J.F., **Composition of noble gases in the Abee meteorite, and the origin of the enstatite chondrites,** Tucson, University of Arizona, 1982, 162p., University Microfilms order No. 83-03395, Ph.D. thesis. Refs. p.151-162.

The Abee enstatite chondrite breccia was studied using two methods: measurement of noble gases, and analyses of the clast size-distribution and the overall texture of Abee. These studies were made in order to understand the formation of the Abee breccia and the formation of the enstatite chondrites. Noble gases were measured as a part of the consortium effort. The clast size-distribution of Abee and 2 other meteorites from the Antarctic meteorite collection (BTNA 78004, ALHA 78113) was measured. The 3 meteorites appear to have formed during single, low energy impacts and Abee was part of an ejecta blanket which mixed with surrounding regolith. From the textural study, a formation model for the Abee breccia is discussed. The breccia formed during a single impact. Clast metal rims were vapor deposited and partially metamorphosed during impact-generated heating. Greater heating formed dark and metal inclusions. Maximum temperatures were less than 1200 C and heating was brief. Later, the material was disturbed but not brecciated. Abee did not reside on an asteroidal regolith surface for a significant period of time due to the lack of pre-irradiation. This model suggests that the E-chondrite groups formed by metamorphic heating and metal to silicate fractionation on a single parent body. (Auth.)

E-30295

Smith, M.R., **Chemical and petrological study of igneous lithic clasts from the Kapoeta howardite,** Corvallis, Oregon State University, 1983, 194p., University microfilms order No. 82-26269, Ph.D. thesis. Refs. p.156-165.

Instrumental and radiochemical neutron activation analyses supported by electron microprobe mineral analyses and petrographic observations are presented for approximately forty individual clasts separated from the Kapoeta howardite. Final conclusions are presented which attempt to account for the compositional variations observed in normal eucrites, diogenites, pallasites and the howardite lithic clasts observed in this work. The evolutionary sequence includes initial production of extensive core melts leaving pallasitic-like residuals, generation of near surface low-degree partial melts, crystallization of extruded primary melts and cumulate remelting episodes.

E-30296

Mason, B., Delaney, J.S., Prinz, M., Takeda, H., **Definition of a howardite,** *Meteoritics,* 1983 18(3), p.245, 3 refs. Reply by J.S. Delaney, M. Prinz and H. Takeda, Ibid. p.247-248. 7 refs. For the paper being commented on see E-29802.

The comment is made that the proposal to redefine howardites as basaltic achondrites containing more than 10% of magnesium orthopyroxenite (diogenite) component should be rejected and an earlier definition—of howardites as polymict pyroxene-plagioclase achondrites containing magnesian orthopyroxene in any amount—should be retained. The reply defends the original proposal on the basis of the following advantages: the antarctic polymict eucrites are fitted into an appropriate part of the basaltic achondrite suite; it provides a definition of meteorite groups more consistent with their content; and it eliminates ambiguity when referring to at least one antarctic polymict eucrite, Elephant Moraine 79004.

E-30306

Kyte, F.T., **Analyses of extraterrestrial materials in terrestrial sediments,** Los Angeles, University of California, 1983, 152p., University Microfilms order No. 83-22001, Ph.D. thesis. Refs. p.150-152.

Analyses of Cretaceous-Tertiary boundary sediments from Denmark and two Pacific sites have aided in demonstrating that the high concentrations of Ir in this boundary is a global phenomenon. Anomalous concentrations of Ir and Au in a Late Pliocene section from the Antarctic Basin was the first such discovery since the KT boundary. Associated coarse-grained debris contains a vesicular impact melt and unmelted clasts of the projectile. Chemical and petrographic evidence indicates that this horizon resulted from the oceanic impact of an asteroid similar to mesosiderite or howardite meteorites. Estimates of the projectile diameter are in the range of 100 to 500m. (Auth. mod.)

E-30310

Green-Hammond, K.A., **Environmental aspects of potential petroleum exploration and exploitation in Antarctica: forecasting and evaluating risks. Final report,** Feb. 1982, 34p., PB82-169 772, 7 refs.

The environmental impacts of oil and natural gas exploration underway in the Antarctic are discussed. Data which must be collected to make a proper risk assessment are identified. Factors are described that should be considered in determining whether possible adverse effects are acceptable.

E-30319

Le Roex, A.P., Erlank, A.J., **Quantitative evaluation of fractional crystallization in Bouvet Island lavas,** *Journal of volcanology and geothermal research,* Aug. 1982 13(3-4), p.309-337, Refs. p.335-337.

DLC QE521.5.J67

Bouvet Island, situated near the southernmost end of the Mid-Atlantic Ridge, is characterized by lavas ranging in composition from hawaiite through mugearite and benmoreite to rhyolite. Major and trace elements vary systematically throughout the sequence, as do mineral compositions, and geochemical modeling indicates that the compositional variations observed in the differentiated lavas can be ascribed to extensive fractional crystallization of a parental hawaiite magma. This fractional crystallization (64%), possibly separated in time, of the parental hawaiite gave rise to the benmoreite magma. In the latter scheme the fractionating phases are similar both in composition and proportion to those crystallizing in the passage from hawaiite to mugearite, suggesting that the Bouvet Island hawaiites correspond in composition to a six phase saturation surface and that the more differentiated lavas resulted from differing degrees of crystallization on this surface. (Auth.)

E-30353

Webby, B.D., comp, **Ordovician system in Australia, New Zealand and Antarctica. Correlation chart and explanatory notes,** International Union of Geological Sciences. Publication No.6, April 1, 1981, 64p., Refs. p.50-64.

Correlation of the Ordovician formations in Australia, New Zealand and Antarctica is depicted in a sixty-two column chart. Explanatory notes giving such information as age and stratigraphic relationships are included for each stratigraphic unit of the chart. The biostratigraphic framework is outlined, and the evidence for correlations both within the region and with standard Series and Stages overseas. The problems of recognizing Ordovician systemic boundaries are also discussed. A review of evidence for and against the presence of rocks of Ordovician age in the Antarctic is added, together with an extensive, relevant bibliography for the Ordovician System of the region. (Auth.)

E-30373

Prentice, M.L., **Surficial geology and stratigraphy in central Wright Valley, Antarctica implications for antarctic Tertiary glacial history,** Orono, University of Maine, 1982, 248p., M.S. thesis. Bibliography p.119-148.

The surficial geology and stratigraphy of central Wright Valley was studied by mapping and examining over 140 1-12 m deep excavations along with Dry Valley Drilling Project cores 4A and 14. The primary stratigraphic units were correlated on the basis of field appearance, grain size, clast shape, clast lithology, clast fabric, fossil content, and surface morphology. Jason glacimarine diamicton is discontinuously distributed across the glacially eroded valley floor up to 220 m in elevation and averages 6 m in thickness. This slightly pebbly sandy mud exhibits variable stratification, glacially shaped dropstones, worm galleries, shell fragments and diatoms. At Prospect Mesa, Jason diamicton passes upward through an abrupt-to-interbedded contact into complexly stratified sandy gravel which contains *in situ* pecten and foraminiferal assemblages. Both units were deposited in a fjord that was partially covered with an ice shelf derived from the west. Co-occurrence of marine diatoms *Denticulopsis lauta* and *D. hustedtii* suggests that Jason fjord existed sometime between middle Middle Miocene and middle Late Miocene time. The carving of Wright Valley involving both mountain and ice sheet glaciation predated this fjord. Peleus till overlies Jason diamicton and outcrops discontinuously up to 1150 m in elevation. Peleus till is muddy sandy pebble gravel and exhibits well-developed fissility, glacially shaped clasts, little stratification, and few fossils characterize the unit. The physical characteristics of Peleus till and its correlation to drift in adjacent mountains suggests that Peleus ice was part of an extensive ice sheet that overtopped the 2000-2400 m high mountains as it flowed northeastward across the dry valleys topography. The Peleus glaciation predates subaerially erupted volcanics in eastern Wright Valley with K/Ar ages up to 4.2 my. (Auth.)

E-30383

Collinson, J.W., Elliot, D.H., **Geology of Coalsack Bluff, Antarctica,** *American Geophysical Union. Antarctic research series,* 1984 36(6), Geology of the Central Transantarctic Mountains, p.97-102, Refs. p.101-102.

Coalsack Bluff, a small nunatak in the central Transantarctic Mountains, is the first major Antarctic discovery site of bones of the tetrapod fauna characterized by *Lystrosaurus*. Rock units on Coalsack Bluff include the upper 220 m of the Buckley Formation and the lower 270 m of the Fremouw Formation. The Buckley Formation, dominated by carbonaceous beds containing fossil plants of the *Glossopteris* flora, is Permian in age. The overlying Fremouw Formation, a cyclical sequence of fluvial sandstone, siltstone, and mudstone contains near its base amphibian and reptile bones that represent the Lower Triassic *Lystrosaurus* Zone. A disconformity with slight relief, representing the Paleozoic-Mesozoic boundary, separates these two formations. Tectonic deformation is closely associated with diabase intrusions that are radiometrically dated as Middle Jurassic. (Auth.)

E-30384

Elliot, D.H., ed, **Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1983-June 30, 1984,** Washington, D.C., National Academy Press, 1984, 99p., Numerous refs.

This is the 16th annual report of the Polar Research Board to SCAR, prepared as a current awareness publication for the international community of antarctic earth scientists. Investigators and participating institutions are indexed separately. Each investigator is listed with affiliation and he or she provides a brief statement of field and laboratory work, publications issued and in press, and a closing statement of anticipated future programs.

E-30386

Tasch, P., **Antarctica, Africa, Australia—Mesozoic Conchostracan dispersal,** *Antarctic journal of the United States,* 1983 18(5), p.78-79, 1 ref.

Progress on studies of Gondwana Estheriids is reported. Antarctic-Africa conchostracan ties are noted for the following species: *Cyzicus (Lioestheria malangensis)* (Marliere), *Glyptoasmussia* cf. *lueckensis* Defretin Le Franc, *Glyptoasmussia corneti* Defretin Le Franc, and *Pseudoasmussiata* sp. 1. An important Antarctic-Australia Mesozoic tie is *Paleolimnadia (Grandilimnadia)* cf. *glenleensis* (Mitchell). Several conchostracan fossils of a new cyziciid species were recovered from the David Elliot collection from Agate Peak. Conchostracan-bearing beds at Mauger Nunatak are contemporaneous with those of Storm Peak and Blizzard Heights.

E-30387

Cassidy, W.A., **Antarctic search for meteorites, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.80, 4 refs.

Antarctic meteorite studies conducted during the 1982-83 field season included westward extension of the Allan Hills triangulation net, meteorite recoveries at the Allan Hills far western icefield and Elephant Moraine, and a reconnaissance visit to the Thiel Mountains and Pecora Escarpment, where meteorite concentrations were found on exposed ice. A total of 113 meteorites were recovered during the season. One meteorite from the 1981-82 collection has been identified as a lunar sample. The possible origin from the Martian surface of several rare types of achondritic meteorites: shergottites, nakhlites, and chassignites, is considered.

E-30388
Cassidy, W.A., Meunier, T., Buchwald, V., Thompson, C., **Search for meteorites in the Allan Hills/Elephant Moraine area, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.81-82, 3 refs.

Meteorites were discovered for the first time at the Allan Hills far western icefield and at sites northwest of Elephant Moraine. A meteorite (field number 2995) discovered at the far western icefield almost completely embedded in ice seemed to be a fresh specimen being exposed for the first time at the ablation surface. If this interpretation is correct, it will be possible to determine the age of the enclosing ice as well as the terrestrial age of the meteorite and thus provide a check on age determination methods currently being developed for ancient ice. The locations of six points to be used as base stations in mapping meteorite finds were precisely determined with the use of two Magnavox geoceivers. Geographic coordinates and elevations are given, and field data for one station are compared with post-processed data.

E-30389
Schutt, J., Rancitelli, L.A., Krähenbühl, U., Crane, R., **Exploration for meteorite concentrations in the Thiel Mountains/Pecora Escarpment region, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.83-86, 3 refs.

This report details the results of exploration for meteorites around Thiel Mountains and Pecora Escarpment, and the icefields around Davies Escarpment and Moulton Escarpment in the vicinity of the Thiel Mountains. The areas visited are described. Fifty meteorite specimens were recovered from the Pecora, the Davies, and the Moulton Escarpments. Forty-four are tentatively identified as ordinary chondrites and six as achondrites. All locations of recovered meteorites were mapped. The Pecora Escarpment and the Moulton Escarpment probably contain significant meteorite concentrations. Concentrations along the Davies Escarpment are thought to be minor.

E-30390
Mason, B., Clarke, R.S., Jr., **Characterization of antarctic meteorites,** *Antarctic journal of the United States,* 1983 18(5), p.87, 1 ref.

Meteorites are classified by mineral compositions and textural relationships into four groups: chondrites, achondrites, stony-irons, and irons. The 1980-81 collection has been completely characterized—32 specimens from the Allan Hills, 67 from the Reckling Peak area, and 1 near Outpost Nunataks. One hundred and forty-five meteorites from the 1981-82 collection have been characterized. The classifications are outlined.

E-30391
Lipschutz, M.E., **Meteorite studies: Terrestrial and extraterrestrial applications,** *Antarctic journal of the United States,* 1983 18(5), p.87-88, 9 refs.

The search for meteorites in Victoria Land and elsewhere has returned about 1,300 specimens from the 1976-77 through 1982-83 field seasons. The specimens are being characterized and released to be studied by over 100 research groups in 14 countries. Characterization includes estimation of terrestrial alteration, and trace elements are being determined. The results enable the use of meteorites as probes of extraterrestrial processes and terrestrial weathering. A number of recommendations concerning meteorite research have resulted from a workshop held in Apr. 1982 to examine the overlap between antarctic glaciology and meteorites. Studies of the Allan Hills sample 81005 indicate that this meteorite originated on the moon. Further, a Martian origin has been suggested for the more severely shocked shergottite, nakhlite, and chassigny meteorites.

E-30392
French, B.M., **Curation of meteorites in the NASA Johnson Space Center, Houston, Texas,** *Antarctic journal of the United States,* 1983 18(5), p.89-90, 3 refs.

The curation and distribution of antarctic meteorites by the Johnson Space Center at Houston, Tex. is described. The goals of the program are to characterize, preserve, subdivide, and distribute specimens. The meteorites are kept in stainless steel cabinets in an atmosphere of dry nitrogen, handled with noncontaminating materials, and carefully documented. More than 1,150 stony meteorites obtained since 1977 are under curation at JSC. Cooperative studies are being initiated with Japanese scientists who have collected more than 5,000 meteorites in order to share technical and management details and to assist in making their specimens more readily available.

E-30393
Waitt, R.B., Jr., **Thicker west antarctic ice sheet and peninsula icecap in late-Wisconsin time—Sparse evidence from northern Lassiter Coast,** *Antarctic journal of the United States,* 1983 18(5), p.91-93, 18 refs.

Sparsely distributed glacial striae and erratics in the mountains of the northern Lassiter Coast indicate that the Antarctic Peninsula icecap was formerly much thicker than it is today. The glacial geology of the area is explored. Sparse weathering of erratics on nunataks in the Lassiter Coast region suggests that the thick-ice stage evidenced in the southern Antarctic Peninsula is late-Wisconsin age.

E-30394
Denton, G.H., Kellogg, D.E., Kellogg, T.B., Prentice, M.L., **Ice sheet overriding of the Transantarctic Mountains,** *Antarctic journal of the United States,* 1983 18(5), p.93-95, 13 refs.

Evidence for late Tertiary overridings of the Transantarctic Mountains by an expanded antarctic ice sheet considerably larger than those of late Quaternary ice ages is presented. Imprints of glacial erosion record angular overriding of the preexisting mountain-and-valley topography by northeastward-flowing ice. The overriding ice sheet modified preexisting alpine topography in the Asgard and Olympus Ranges, Quartermain Mountains, and Kukri Hills producing an array of subglacial deposits and erosional features and depositing basal sediments on the eroded landscape. It is believed that the overriding was multiple and that one episode occurred more than 9 to 15 m.y.a. A minimum age between 2 and 3.38 m.y. has been suggested for the overriding.

E-30395
Webb, P.N., Harwood, D.M., McKelvey, B.C., Mercer, J.H., Stott, L.D., **Late Neogene and older Cenozoic microfossils in high elevation deposits of the Transantarctic Mountains: Evidence for marine sedimentation and ice volume variation on the east antarctic craton,** *Antarctic journal of the United States,* 1983 18(5), p.96-97, 15 refs.

Pliocene and older marine diatoms and a variety of pre-Pliocene microfossils occur in samples of the Sirius Formation, collected more than 2,500 m above sea level in the Transantarctic Mountains. These occurrences record one or more phases of deglaciation of marine-based portions of the east antarctic ice sheet, marine invasion of the Wilkes and other subglacial basins, and final re-establishment of the east antarctic ice sheet sometime in the last 3 million years. Marine sediments rich in diatom and other microfossil remains, deposited during marine invasions of intracratonic basins, were stripped from basin floors and transported by the east antarctic ice sheet over the summits of the Transantarctic Mountains in the late Pliocene or Pleistocene.

E-30396

Harwood, D.M., **Diatoms from the Sirius Formation, Transantarctic Mountains,** *Antarctic journal of the United States,* 1983 18(5), p.98-100, 8 refs.

The Sirius Formation contains reworked marine diatom assemblages of Upper Eocene, Upper Oligocene, Upper Miocene, and Pliocene ages. These diatom assemblages will aid in unravelling the Cenozoic marine depositional history on the east antarctic craton and provide an approximate stratigraphy of the sedimentary sequence beneath the east antarctic ice sheet. Marine diatoms identified in samples from the Reedy and Beardmore Glacier areas and from Mount Feather are outlined. Foraminifera, radiolaria, silicoflagellates, calcareous nannoplankton, sponge spicules, ostracodes, and palynomorphs were associated with the diatoms.

E-30397

Potter, N., Jr., Wilson, S., **Glacial geology and soils in Beacon Valley,** *Antarctic journal of the United States,* 1983 18(5), p.100-103, 6 refs.

The glacial history and soils of Beacon Valley have been studied as part of a project to investigate the glacial history of the McMurdo Sound region. The major objectives were: (1) to map glacial features and determine the chronology of glacial events using soils as relative age indicators, (2) to study fluctuations of Taylor Glacier where it has entered lower Beacon Valley, and (3) to study the behavior of alpine glaciers and ice-cored rock glaciers that originate in tributary lateral valleys (LV) and mantle the main valley floor. Eighteen soil pits were excavated, described, and sampled and 57 samples were collected for soil chemical analysis. In addition, 57 samples were collected from shallower excavations for particle size and mineralogical analysis. Surface boulder weathering counts were performed on a minimum of 100 boulders larger than 25 centimeters near each soil pit and on rock glacier lobes.

E-30411

Keller, G., D'Hondt, S., Vallier, T.L., **Multiple microtektite horizons in Upper Eocene marine sediments: No evidence for mass extinctions,** *Science,* July 8, 1983 221(4606), p.150-152, 20 refs. and notes.

Microtektites have been recovered from three horizons in eight middle Eocene to middle Oligocene marine sediment sequences. Five of these occurrences are coeval and of latest Eocene age; three are coeval and of early late Eocene age; and three are of middle Oligocene age. There is no evidence for mass faunal extinctions at any of the microtektite horizons. Many of the distinct faunal changes that occurred in the middle Eocene to middle Oligocene can be related to the formation of the Antarctic ice sheet and the associated cooling phenomena and intensification of bottom currents that led to large-scale dissolution of calcium carbonate and erosion, which created extensive hiatuses in the deep-sea sediment records. (Auth.)

E-30415

Stewart, L.M., Okal, E.A., **Seismicity and aseismic slip along the Eltanin Fracture Zone,** *Journal of geophysical research,* Dec. 10, 1983 88(B12), p.10,495-10,507, 55 refs.

The seismic history of the Eltanin Fracture Zone on the Pacific-Antarctic Ridge for the years 1920-82 shows that the seismic slip accumulated during this recording interval accounts for only a small fraction of the amount of slip predicted by kinematic models of plate motion. It is proposed that the remainder of the plate motion along the transform faults making up the Eltanin system occurs as aseismic creep. The absence of records of any gigantic earthquakes and the geometry of the fault area reduce the likelihood of the Eltanin rupturing along its entire length. The Eltanin Fracture Zone is interpreted in the light of an "asperity" model, involving small, well-separated asperities. (Auth.)

E-30416

Loutit, T.S., Kennett, J.P., Savin, S.M., **Miocene equatorial and southwest Pacific paleoceanography from stable isotope evidence,** *Marine micropaleontology,* Dec. 1983 8(3), p.215-233, Refs. p.230-233.

Stable isotope results from seven Miocene Deep Sea Drilling Projects in the equatorial and southwest Pacific Ocean (previously correlated using carbon isotope stratigraphy) were examined, discussed, and interpreted in terms of the development of the Miocene Pacific Ocean. The southwest Pacific probably was responding uniformly to some global or at least Pacific-wide control during the Early Miocene. In the Middle Miocene the response became more complex as the low and high latitudes began to show independent trends. The changes in the thermal (vertical and latitudinal) structure probably occurred in response to the build-up of the East Antarctic ice-sheet, intensification of bottom-water circulation, and an increase in zonal circulation in surface waters in the Southern Hemisphere. (Auth. mod.)

E-30418

Sears, D.W.G., Weeks, K.S., Rubin, A.E., **First known EL5 chondrite—evidence for dual genetic sequence for enstatite chondrites,** *Nature,* March 15-21, 1984 308(5956), p.257-259, 16 refs.

The enstatite chondrites form two compositionally distinct groups (the EH and EL chondrites) and four petrologic types (types 3-6), where each type represents increasing degrees of metamorphic alteration. Prior to the recovery of the antarctic meteorite Reckling Peak A80259, the subject of this report, all known EL chondrites were petrologic type 6, whereas all known EH chondrites were types 3-5. The authors report the discovery of the first EL5 chondrite. An EL5 breaks the EH3, 4-EH5-EL6 sequence, and indicates that the enstatite chondrites constitute two discrete, isochemical metamorphic sequences, EH3-5 and EL5-6. (Auth.)

E-30424

Recq, M., Charvis, P., Hirn, A., **Preliminary results on the deep structure of the Kerguelen Ridge, from seismic refraction experiments** [Premières données sur la structure profonde de la ride de Kerguelen, d'après la réfraction sismique], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 2,* Dec. 19, 1983 297(13), p.903-908, In French with English summary. 21 refs.

In March 1983, seismic refraction profiles were carried out on the ground for the first time at Kerguelen. Preliminary results from first arrival studies show that thickness of the crust is only 15 km beneath the eastern area and increases toward the center of the archipelago. The seismic velocity vs. depth distribution is similar to that of oceanic aseismic ridges (i.e. Crozet and Madagascar Ridges). These preliminary data on the deep structure of the crust favor the hypothesis of an oceanic origin for the Kerguelen Islands and for the Kerguelen-Heard submarine plateau. (Auth.)

E-30426

Webb, P.N., Harwood, D.M., McKelvey, B.C., Mercer, J.H., Stott, L.D., **Cenozoic marine sedimentation and ice-volume variation on the East Antarctic craton,** *Geology,* May 1984 12(5), p.287-291, Refs. p.290-291.

Recycled Cretaceous and Cenozoic marine microfossils have been recovered from samples of the Pliocene Sirius Formation. Samples were collected from outcrops in the Reedy, Beardmore, and Ferrar glacier areas of the Transantarctic Mountains between lat 77-86 S. The glaciogene sediments contained diatoms, foraminifera, calcareous nannoplankton, silicoflagellates, radiolarians, sponge spicules, palynomorphs, and ostracodes of Late Cretaceous, Paleocene, Eocene, late Oligocene, late Miocene, and Pliocene age. This suggests the presence of open marine basins on the East Antarctic Craton during late Mesozoic and Cenozoic time. The apparent absence of early Oligocene and early through middle and earliest late Miocene assemblages suggests either that marine regression exposed the basin floors or that ice filled the basins during these times. The high-elevation setting of Sirius Formation outcrops suggests they are a mixture of derived sediments stripped from sub-ice intracratonic basins and subsequently redeposited by ice flowing up the inland slope of the Transantarctic Mountains. (Auth.)

E-30427

Wright, T.O., Ross, R.J., Jr., Repetski, J.E., **Newly discovered youngest Cambrian or oldest Ordovician fossils from the Robertson Bay terrane (formerly Precambrian), northern Victoria Land, Antarctica,** *Geology,* May 1984 12(5), p.301-305, 18 refs.

Several species of fossils that indicate an age almost precisely at the Cambrian-Ordovician boundary were collected from a limestone olistolith found in turbidite sandstone and shale from Handler Ridge, an area previously mapped as late Precambrian Robertson Bay Group. The rocks enclosing the olistolith are therefore of this age or younger, not Precambrian, with important implications to the early Paleozoic history of the Transantarctic Mountains. (Auth.)

E-30432

Debrenne, F., Rozanov, A.IU., Webers, G.F., **Upper Cambrian Archaeocyatha from Antarctica,** *Geological magazine,* July 1984 121(4), p.291-299, 31 refs.

Reconnaissance geological mapping (1962-75) followed by detailed geological investigations (1979-80) in the Ellsworth Mountains of West Antarctica have established the existence of extensive Middle and Late Cambrian strata. Forms tentatively referred to Archaeocyatha have been examined and it was concluded that, despite the commonly held opinion that the phylum became extinct at the boundary of the Lower and Middle Cambrian, the Ellsworth Mountains' forms in fact represent Irregularian Archaeocyatha which survived in protected niches into the Late Cambrian. The age of the fauna containing the archaeocyaths is firmly dated by abundant trilobites including species of *Homagnostus, Pseudognostus, Kormagnostella, Erixanium* and *Onchopeltis.* (Auth.)

E-30438

Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol. 7 No. 1, Feb. 1984,** Houston, Texas, NASA Johnson Space Center, 1984, 45p.

This newsletter contains a complete list of all classified antarctic meteorites curated at the Johnson Space Center and Smithsonian Institution, including samples from the 1976-1982 field seasons. Physical and photographic descriptions of 29 meteorites, and their locations in Antarctica, are also presented.

E-30447

Tessensohn, F., **Present knowledge of non-living resources in the Antarctic, possibilities for their exploitation and scientific perspectives,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.189-210, Refs. p.208-210.

The subject is treated in two stages, first dealing with the speculations which result mainly from the calculation of general figures from other continents and then with the geological considerations with a more scientific background. Both are aimed to predict certain mineral occurrences in the Antarctic in analogy to other areas. The second stage is dealt with in somewhat more detail to lay open the arguments for the prediction of Antarctic resources. Against this background the present knowledge of mineral resource occurrences in the Antarctic is reviewed. It is done separately for on- and off-shore resources because the approach for both groups is fundamentally different. Economic considerations are presented and an outlook into the future is given.

E-30448

Kappen, L., **Ecological aspects of exploitation of the non-living resources of the antarctic continent,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.211-217, 21 refs.

Possible effects of mining for coal and iron both on ice covered and ice free areas are pointed out especially with reference to the limited vegetation cover. Offshore oil exploration has the potential for very seriously upsetting the fragile antarctic environment.

E-30451

Richter, W., **On the physical geography of the Schirmacher Oasis (East Antarctica, Dronning Maud Land),** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.23-29, 11 refs.

The Schirmacher Oasis is one of the small, essentially snow- and ice-free high-polar rock deserts near the shore. It was discovered in 1939 and became accessible to intensive exploration with the establishment in 1961 of Novolazarevskaya Station. The 1961-1980 series of meteorological observations showed an average annual temperature of -10.5 C. In January, which is the warmest month, the mean temperature was -0.7 C. The average temperature determined for the month of July is -17.8 C. The mean wind velocity determined for the area is 10 m/s, the principal wind direction being east-southeast. Accumulations of precipitation are of minor importance in the Schirmacher Oasis. The size of this load-cast rock shelf is some twenty-seven square kilometres. About ten per cent of its area is covered with snow and firn ice fields and the same fraction with surface waters. The latter include more than 180 water bodies (lakes, ponds, pools) of different size, depth, basin morphology, and origin. (Auth.)

E-30453

Richter, W., Wand, U., Strauch, G., Kowski, P., Kurze, W., **Isotope-hydrological and hydrochemical characterization of lakes in the Schirmacher Oasis (East Antarctica),** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.47-73, 21 refs.

An investigation of deuterium variations provided information on the deposition of meltwater at different depths under isothermal conditions. Inclusion of O-18 variations enables general relations to be established between inflow, sea water, and evaporation behaviour. As to thermal regime and the distribution of isotopes, deeper lakes and ponds show variations that are comparable to the seasonal variations observable in more temperate regions. The long-lasting winter phase of stagnation is followed by a short phase of circulation that frequently depends largely on wind conditions, with a relatively short time of transition. By means of tritium studies first estimates of the proportion of recent precipitation in the flow of melt water were made; additional hydrochemical studies were also made. (Auth. mod.)

E-30454

Hermichen, W.-D., Grelle, M., Kowski, P., Kurze, W., Wand, U., **Isotope-hydrological and hydrochemical studies of the interior antarctic lake "Untersee" in the Wohlthat Massif, Dronning-Maud Land (East Antarctica),** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.75-86, 18 refs.

In the course of field work done during the 26th Soviet Antarctic Expedition, members of the Central Institute for Isotope and Radiation Research, Leipzig, carried out an initial measuring and sampling program on Lake Untersee in March 1982. The data gave the following model of the origin and evolution of this largest interior Antarctic fresh-water lake. The lake came into existence as a melt-water lake during a climatically favourable time in the post-Pleistocene period. A homogenization of the entire body of water is presently taking place in the austral summer due to convection. Evidence for this is provided by the constancy of the water temperature, the isotope data, and the degree of salt concentration. Tritium content is 0 T.U., the lake being fed exclusively, via subaquatic melting processes, with "pre-bomb age" inland ice. Satellite photographs show nothing but bare ice zones in the more distant areas surrounding Lake Untersee. Thawing proceeding in the lake's vicinity are of no consequence at present. The data suggest a permanent ice cover of the lake during its post-Pleistocene existence. The lake is constantly losing water through sublimation on the surface of the more than 2.5 m thick ice cover and freezing of lake water at its bottom; at the present time, it is the remainder of a many times greater amount of melt water. It is still unknown whether the lake's mass balance is in a state of equilibrium. (Auth.)

E-30457

Kaiser, G., Wand, U., **K-Ar dating of basalt dykes in the Schirmacher Oasis, Dronning Maud Land, East Antarctica,** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.123-132, 35 refs.

The Precambrian crystalline basement exposed in the Schirmacher Oasis is traversed by a number of basalt (dolerite) dykes. First age determinations on these rocks by the conventional K-Ar method showed that the dykes were emplaced probably over a long time interval. It seems that there are different generations of basalt intrusion: an Upper Carboniferous (about 300 Ma) and a Jurassic one (about 150 Ma). The new age data are discussed with respect to the regional igneous activity related to the breakup of Gondwanaland. (Auth.)

E-30458

Hamer, R.D., Hyden, G., **Geochemistry and age of the Danger Islands pluton, Antarctic Peninsula,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.1-19, 22 refs.

The geology of the Danger Islands is described in detail for the first time. They comprise a cogenetic suite of mainly leucocratic gabbroic rocks with minor alkali-rich differentiates. Rb-Sr dating indicates a late Cretaceous age of emplacement. (Auth.)

E-30459

Heilbronn, T.D., Walton, D.W.H., **Morphology of some periglacial features on South Georgia and their relationship to local environment,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.21-36, 29 refs.

Small sorted stripes, large vegetated unsorted stripes, large unsorted circles and two types of solifluction lobes are described by means of vertical sections and particle-size analysis. Where possible, vegetation is related to periglacial morphology. Soil temperature patterns and depth and duration of snow lie are related to periglacial activity for some features. Sorting in the stripes appears to be only superficial and takes place almost wholly in autumn. There is little sign of downslope movement of the solifluction lobes. The role of needle ice is discussed. (Auth.)

E-30466

Thomson, M.R.A., **Preliminary ammonite zonation of the mid-Cretaceous rocks of James Ross Island,** *British Antarctic Survey. Bulletin,* Aug. 1984 No.64, p.85-91, 16 refs.

Detailed stratigraphical investigations by J.A. Crame, J.R. Ineson and the author during the 1981/82 and 1982/83 Antarctic summers, have confirmed that on the western side of James Ross Island the poorly consolidated siltstones and mudstones of the SHIS are underlain by 2300 m of siltstones, sandstones and conglomerates with no exposed base. Provisional facies analysis of the pre-SHIS rocks suggests that they were deposited in submarine fan and slope apron settings. They contain a variety of mainly molluscan faunas; those exposed between Kotick Point and the southern end of Tumbledown Cliffs in particular, contain a succession of ammonite faunas indicative of the Albian and Cenomanian stages. An earlier (Aptian?) fauna is present at Stoneley Point, whereas poorly preserved ammonites on Persson Island are likely to be of late Turonian-early Coniacian age, in view of their association with *Inoceramus madagascariensis* Heinz. Fragments of probable Coniacian ammonites have also been obtained from south-east Brandy Bay area. The early to mid-Cretaceous rocks exhibit complex facies variations along the west coast of James Ross Island, parallel to the depositional strike, and lithological correlations between measured sections more than about 1 km apart are proving difficult. The recent work makes it clear that Bibby's (1966) simple lithostratigraphical scheme will require modification, and significant changes will have to be made to the geological map in a number of areas. (Auth. mod.)

E-30468

Jones, J.B., Fitzgerald, M.J., **Extensive volcanism associated with the separation of Australia and Antarctica,** *Science,* Oct. 19, 1984 226(4672), p.346-348, 19 refs.

Alternating hard and soft layers characterize the Gull Rock and Tuit Members of the late Eocene Blanche Point Formation, South Australia. Originally the formation was mainly a mixture of volcanic ash, sponge spicules, and calcareous fossil remains, with hard layers produced later by selective silicification. It resembles Cretaceous sediments from western Europe and the eastern coast of the United States, and in each case it appears that alteration of volcanic ash produced smectite and clinoptilolite with release of silica that subsequently crystallized as opal-CT. The occurrence of similar deposits from New Zealand to as far west as Albany, Western Australia, indicates extensive volcanic activity south of Australia in the late Eocene resulting from rifting and separation from Antarctica. (Auth.)

E-30469

Becker, R.H., Pepin, R.O., **Case for a Martian origin of the shergottites: nitrogen and noble gases in EETA 79001,** *Earth and planetary science letters,* Aug. 1984 69(2), p.225-242, 43 refs.

Nitrogen and noble gases were measured in samples of a glass inclusion and the surrounding basaltic matrix from the antarctic shergottite EETA 79001. A nitrogen component trapped in the glass, but not present in the matrix, has a delta N-15 value at least as high as +190 per mill. Ratios of Ar-40/N-14 and N-15/N-14 in the glass are consistent with dilution of a martian atmospheric component (delta N-15=620, Ar-40/N-14=0.33) by either terrestrial atmosphere adsorbed on the samples or by indigenous nitrogen from the minerals of the rock. Trapped noble gases in the glass reproduce, within error, the elemental and isotopic compositions measured in Mars' atmosphere by Viking, and are in general agreement with previous measurements except for much lower abundances of neutron-generated krypton and xenon isotopes. The most reasonable explanation at the present time for the noble gas pattern and the isotopically heavy nitrogen is that a sample of martian atmosphere has been trapped in the EETA 79001 glass, and that this meteorite, and thus the shergottites and probably the nakhlites and chassignites as well, originated on Mars. (Auth. mod.)

E-30472

Andrews, B.A., **Petrologic study of Weddell Sea sediments: implications for provenance and glacial history,** Houston, Texas, Rice University, 1984, 203p., M.A. thesis. Refs. p.149-155.

Petrologic data validates identifications, originally based on sedimentologic criteria, of basal tills on the Weddell Sea continental shelf. The presence of basal tills indicates a major expansion and coincident grounding of the East or West Antarctic Ice Sheet to the shelf edge. Petrologic evidence suggests that glacial expansion in the area of study was chiefly that of the East Antarctic Ice Sheet. Basal tills and transitional glacial marine sediments form distinct petrologic provinces on the Weddell Sea shelf. Most province boundaries extend inland parallel to reconstructed ice paleoflow lines. Till lithologies are dominated by volcanics and quartzose sedimentary rocks, in contrast to metamorphic outcrops of the Weddell Sea region. Comminution does not effectively bias till composition. Till lithologies suggest that mountainous outcrops are not representative of subglacial geology and that sedimentary basins exist beneath the Antarctic Ice Sheet. Four provenance areas for the Weddell Sea basal tills are modeled; correlations between modeled provenance areas and till petrologic provinces are good. (Auth. mod.)

E-30474

Smith, A.G., Drewry, D.J., **Delayed phase change due to hot asthenosphere causes Transantarctic uplift,** *Nature,* June 7, 1984 309(5968), p.536-538, 30 refs.

The Transantarctic Mountains are one of the world's major mountain chains, extending 3,500 km across Antarctica in a belt 200-500 km wide. The region has been uplifted by at least 4 km since late Mesozoic time, yet there is none of the thrusting, folding, regional metamorphism and andesitic volcanism associated with many other large Cenozoic mountain ranges and apparently related to subduction and subsequent continental collision. Instead, the uplift of the Transantarctic Mountains is attributed here to the delayed effects of the overriding by East Antarctica of anomalously hot asthenosphere forming under West Antarctica in the late Cretaceous. Temperature increases of 100 C are estimated at the base of the lithosphere, with mantle heat flux increasing by about 3.5 mW/m. These changes cause an inferred uplift rate of 90 m/Myr some 50 Myr later. The late Cenozoic volcanism in the Transantarctic Mountains, typified by activity in Victoria Land, is attributed to the previously heated continental lithosphere overriding hot asthenosphere that was brought under Antarctica when it separated from Australia. (Auth.)

E-30477

Funaki, M., **Paleomagnetic investigations of McMurdo Sound region, southern Victoria Land, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Aug. 1984 Ser C No.16, 81p., Refs. p.78-81.

Collected samples, ranging from the Cambro-Ordovician to the Cenozoic age, were examined using several tests of rock magnetism to check the evidence of stability of natural remanent magnetization (NRM) and were then studied paleomagnetically. Samples of Cenozoic volcanic rocks have stable NRM. The position of Antarctica has been almost the same from the late Pliocene age up to present. The position of the virtual geomagnetic pole (VGP) (11 normals and 3 reverses) from the Pliocene age to the present is within a polar cap area of about 30 colatitude. The sequence of lava eruption was determined by synthetic evidence from paleomagnetic, geological and geochronological data. Most samples of Ferrar dolerite of Jurassic age have stable NRM. All were magnetized to the normal polarity and VGP positions were calculated for Wright Valley, Allan Hills and Mt. Fleming. These VGP positions are in reasonable agreement with other Jurassic VGPs from Antarctica. The most samples of Beacon Supergroup have stable NRM of parallel direction to that of Ferrar dolerite. These samples were remagnetized in the Jurassic age and the primary magnetization disappeared. However part of the samples has stable depositional remanent magnetization of the Permo-Triassic age. The direction of NRM is parallel to that of Ferrar dolerite. East Antarctica had no shift from the Permo-Triassic to the Jurassic and Australia must have been linked to Antarctica at least up to the Jurassic age. (Auth. mod.)

E-30490

Dick, H.J.B., Fisher, R.L., Bryan, W.B., **Mineralogic variability of the uppermost mantle along mid-ocean ridges,** *Earth and planetary science letters,* July 1984 69(1), p.88-106, Refs. p.105-106.

Modal analyses of 273 different periodotites representing 43 dredge stations in the Atlantic, Caribbean, and Indian Oceans define three separate melting trends. Peridotites dredged in the vicinity of "mantle plumes" or hot spots have the most depleted compositions in terms of basaltic components, while peridotites dredged at locations removed from such regions are systematically less depleted. The modal data correlate well with mineral compositions, with the peridotites most depleted in pyroxene also having the most refractory mineral compositions. This demonstrates that they are the probable residues of variable degrees of mantle melting. (Auth.)

E-30492

Vine, F.J., **Evidence from submarine geology,** *American Philosophical Society. Proceedings,* Oct. 17, 1968 112(5), p.325-334, 28 refs.

DLC Q11.P5

From the study of oceanic crust created within the Cenozoic it is suggested that the separation of Australia and Antarctica was the last stage in the fragmentation of the southern continents which formerly constituted Gondwanaland.

E-30493

Romer, A.S., **Fossils and Gondwanaland,** *American Philosophical Society. Proceedings,* Oct. 17, 1968 112(5), p.335-343, 15 refs.

DLC Q11.P5

The *Glossopteris* flora, widespread in Gondwana regions and surviving throughout the Permian, is discussed and illustrated, as are various vertebrates from different regions and geological periods, in an effort to substantiate the continental drift theory. It is concluded that the vertebrate, floral and glacial deposits evidence is highly suggestive of the one-time existence of Gondwanaland.

E-30519

Healy-Williams, N., Williams, D.F., Ehrlich, R., **Quantification of morphotypes in *Neogloboquadrina pachyderma* using Fourier shape analysis,** *Antarctic journal of the United States,* 1983 18(5), p.138-140, 9 refs.

Fourier shape analysis, via Fourier series in closed form, was used to quantify morphologic variability in *Neogloboquadrina pachyderma* (Ehrenberg), and relate them, if possible, to hydrographic parameters of the overlying water masses. Fourier analysis was able to determine precisely that four harmonics are required to describe the shape variability in *N. pachyderma* and that the significant shape components are related to the chamber arrangements. Specimens with high harmonic 3 values tend to be four-chambered but with a triangular shape usually resulting from an inflated final order harmonics, 5 and 6, are able to resolve the specimens which have 4 1/2 and 4 1/2 to to 5 chambers, respectively. Linear correlation functions are shown.

E-30521

Lawver, L.A., Meinke, L., Sclater, J.G., **Tectonic reconstructions of the South Atlantic,** *Antarctic journal of the United States,* 1983 18(5), p.142-145, 17 refs.

During Dec. 1980 and Jan. 1981, an expedition aboard R/V *Melville* explored and dredged the America-Antarctic Ridge. As a consequence of that cruise, the present day plate motions were ascertained, and the recent tectonic history of the triple junction between the South America, Africa, and Antarctica plates was postulated. Figure 1 shows the present day locations of the continents of South America, Africa, and Antarctica, the 3,000-m contour, and the major ridges separating them. In the reconstructions made of the paleopositions of the three plates South America was fixed, Antarctica was first moved with respect to Africa, then Antarctica and Africa were moved together with respect to South America. The America-Antarctic Ridge is assumed to have been a ridge-fault-fault (RFF) triple junction for the last 60-65 m.y. The Antarctic Peninsula in its present position has not overlapped with the tip of South America since 60-65 m.y. The reconstructions indicate that Drake's Passage was open at least 15 m.y. before the present phase of seafloor spreading in the Scotia Sea began.

E-30522

Muza, J.P., Williams, D.F., Wise, S.W., Jr., **Paleogene oxygen isotope records for the subantarctic South Atlantic Ocean: DSDP sites 511 and 512,** *Antarctic journal of the United States,* 1983 18(5), p.146-147, 12 refs.

According to Shackleton et al (1975; 81-15142) during the Oligocene the build-up of glacial ice on the antarctic continent reached a critical threshold and thus initiated antarctic bottom water circulation. Disagreement about the exact timing and significance of this event led to the acquisition of a carbonate-bearing sequence across the Eocene/Oligocene boundary on the Falkland Plateau in the Atlantic sector of the southern ocean during DSDP leg 71 (sites 511 and 512). The planktonic and benthic foraminifera analyzed from each site are given. A drastic drop in bottom water temperatures occurred during the early Oligocene at site 511. An expansion in the antarctic water mass could perhaps explain the sharp drop and divergence of bottom- and surface-water temperatures at the site. The isotopic records at sites 511 and 512 can be correlated with the foraminiferal and radiolarian data which also suggest a cooling of surface- and bottom-waters at the sites.

E-30523

Pharr, R.B., Jr., Williams, D.F., Healy-Williams, N., **Diachronous niche expansion and morphological adaptation by *Globorotalia truncatulinoides* in Late Quaternary sediments,** *Antarctic journal of the United States,* 1983 18(5), p.147-149, 17 refs.

An oxygen isotope history for the Maurice Ewing Bank of the eastern Falkland Plateau, Southwestern Atlantic Ocean, has been constructed from Deep Sea Drilling Project Leg 71 sites 511 and 512. The middle Eocene section of site 512 is characterized by fairly stable delta 18-O values in both the benthic and planktonic foraminifera. If we assume that the isotopic composition of sea water at this interval of time was approximately -1.2 per mill then estimated isotopic temperatures indicate that the surface waters and bottom waters (water depth equal 1846 meters) fluctuated between 11 and 9 C with a mean value of near 10 C. In the latest Eocene section of site 511 (water depth = 2589 m), surface and deep water isotopic temperatures are nearly the same as those observed in the middle Eocene but a dramatic cooling is evident in the early Oligocene. Accompanying this temperature decrease is a clear decoupling of nearly 1 per mill between the benthic and planktonic delta 18-O signals (approximately 4 C). The 18-O enrichment observed across the Eocene/Oligocene boundary site 511 is comparable to isotopic changes observed in the Pacific and more temperate latitudes of the Atlantic. The isotopic records at sites 511 and 512 appear to reflect (1) the climatic deterioration that occurred near the Eocene-Oligocene boundary and (2) a possible major expansion of the Antarctic water mass in the South Atlantic.

E-30524

Wise, S.W., Jr., **Coccolith biostratigraphy of Deep Sea Drilling Project leg 71 cores,** *Antarctic journal of the United States,* 1983 18(5), p.150-152, 6 refs.

Falkland Plateau has now yielded the most extensive record of Jurassic to Recent calcareous deposition available for study from this region. Sequences there are especially attractive for coccolith studies because favorable lithologies and the exposure of relatively old stratigraphic units near the surface under low over-burden pressures have enhanced the preservation of older nannofossil assemblages. High latitude provincial forms are common in the Cretaceous and Tertiary sections and have prompted the proposal of new coccolith zones or subzones for the Barremian-Aptian, Albian, Coniacian-Turonian, and the Oligocene. A summary of the coccolith zonation applied to the leg 71 sediments is given as well as definitions of the zones, comments on the new or modified zones plus their reference sections.

E-30525

Parker, M.E., Arthur, M.A., Wise, S.W., Jr., **Carbonate cycles in Aptian-Albian "Black Shales" of the Falkland Plateau,** *Antarctic journal of the United States,* 1983 18(5), p.153-154, 3 refs.

Cretaceous cores from Deep Sea Drilling Project (DSDP) leg 71, site 511, drilled on the eastern Falkland Plateau were examined via carbonate, organic carbon, stable isotope, nannofloral, and ultrastructural analysis in an attempt to determine the mode of origin of thin but discrete pelagic limestone beds intercalated among the black mudstones near the top of the extensive Mesozoic "black-shale" sequence of the Falkland Plateau. The "black shales" are of interest because of their paleoenvironmental significance and their potential as a source rock for petroleum in and around the South Atlantic Basin. Episodes of upwelling and overturn of the water column, rather than influxes of well-oxygenated waters into an otherwise anoxic environment are suggested by both the nannofloral and isotopic analyses as a possible mode of origin of the thin but discrete pelagic limestone beds intercalated among the Falkland Plateau Aptian-Albian black mudstones.

E-30526

Wise, S.W., Jr., Mostajo, E.L., **Eocene-Oligocene calcareous nannofossil assemblages from piston cores taken in the vicinity of deep sea drilling sites 511 and 512, Falkland Plateau,** *Antarctic journal of the United States,* 1983 18(5), p.155-156, 8 refs.

Correlation of middle Eocene piston and drill cores from the Maurice Ewing Bank suggests the following sequence of calcareous nannofossil datums within or bounding the *Discoaster bifax* Subzone of the *Reticulofenestra umbilica* Zone in this area (listed in descending stratigraphic order): last appearance datum: *Chiasmolithus solitus;* first appearance datum: *Reticulofenestra bisecta bisecta;* last appearance datum: *Sphenolithus furcatolithoides;* first appearance datum: *Reticulofenestra umbilica.* The reliability of these datums cannot be ascertained. Nor can the duration of time encompassed by the *Discoaster bifax* Subzone in this region be ascertained. Based on Bukry's (1973) calculations, the subzone spans only about 1 m.y. If that is correct, then the sedimentation rate at site 511 during that time would have been a phenomenal 70 m/m.y. An alternative explanation is that the interval actually spans a greater amount of time.

E-30527

Anderson, J.B., **Preliminary results of Deep Freeze 83 piston-coring program,** *Antarctic journal of the United States,* 1983 18(5), p.157-158, 1 ref.

During Deep Freeze 83, a marine geologic survey of the Marie Byrd Land continental shelf between 150 W and 160 W was conducted using the USCGC *Glacier.* Twenty-two stations were occupied, including 20 piston-coring stations and two bottom-grab sample stations. Bathymetric data were also collected, and a detailed bathymetric map of the area is presently being constructed. Three deep basins occur on the continental shelf: Colbeck Basin, Saunders Basin, and Sulzberger Basin. They are assumed to have been eroded during past glacial maxima. Piston cores from the basins will be tested for this hypothesis. Surface sediments in the area are of 3 types: sand, silty clay, and compound glacial-marine sediments. The implications of these sediments for iceberg and bottom current activity are briefly noted.

E-30528

Ling, H.Y., **Occurrence of *Pseudammodochium* from the subbottom sediments of the Ross Ice Shelf,** *Antarctic journal of the United States,* 1983 18(5), p.159-161, 14 refs.

Among 32 samples from the subbottom of the Ross Ice Shelf examined for siliceous microfossils only 4 samples contained silicoflagellates and/or ebridians. Miocene age is suggested for the basal part of the cored sediments where these microfossils were encountered. Investigations of these subsurface sediments from the Ross Ice Shelf record the southernmost occurrence of genus *Pseudoammodochium* for the first time. Furthermore, the specimens referred to the present genus are all double skeletons of unequal size, and all are with *Lorica* or *Podamphora* stage. This is a sharp contrast to previous records where the majority of specimens in the illustrations are generally without *Lorica* or double skeleton of equal size.

E-30561

Zinsmeister, W.J., **Geology and paleontology of Seymour Island, Antarctic Peninsula,** *Antarctic journal of the United States,* June 1984 19(2), p.1-5, 2 refs.

Results of NSF expeditions to Seymour Island since 1981 are outlined. The eminent suitability of the geologic setting of the island for uncovering the Late Cretaceous and Early Tertiary record is emphasized. Some of the field discoveries include jaw fragments of the extinct marsupial *Polydolops,* remains of large Late Cretaceous marine reptiles, well preserved marine invertebrates (molluscs, starfish, crinoids, crabs, and corals), pre-glacial microfloras, the partial skull of a giant penguin (six feet tall) and other fossil remains. The significance of these finds is pointed out.

E-30564

DeVries, T.J., Stott, L., Zinsmeister, W.J., **Neogene fossiliferous deposits in southern Chile,** *Antarctic journal of the United States,* June 1984 19(2), p.12-13, 7 refs.

Fossil deposits were surveyed in Golfo Corcovada and southward along the Archipielago de los Chonos. The collections are compared to those of Darwin of a century earlier.

E-30571

Bogard, D.D., Nyquist, L.E., Johnson, P., **Noble gas contents of shergottites and implications for the Martian origin of SNC meteorites,** *Geochimica and cosmochimica acta,* Sep. 1984 48(9), p.1723-1739, 60 refs.

Isotopic concentrations of the noble gases have been measured in several different phases of Elephant Moraine A79001 and in whole rock samples of Zagami and Allan Hills A77005, three meteorites which belong to the rare group of SNC achondrites that may have originated from the planet Mars. Shocked phases of EETA 79001 contain a trapped Ar, Kr, and Xe component. These elemental and isotopic ratios are unlike those for any other noble gas component except analyses of the Martian atmosphere made by Viking spacecraft. The isotopic composition of the trapped Kr shows an approximate 1% per mass unit enrichment of lighter isotopes compared to terrestrial Kr, and the trapped Xe may show either a fission component or a fractionated enrichment of heavier isotopes compared to terrestrial Xe. It is hypothesized that these gases represent a portion of the Martian atmosphere which was shock-implanted into EETA 79001, and that they constitute direct evidence of a Martian origin for the shergottite meteorites. (Auth. mod.)

E-30583

Robinson, P.H., Barrett, P.J., **Antarctic Cenozoic glacial workshop,** *New Zealand antarctic record,* 1984 6(1), p.29-35, 28 refs.

On 14 March 1984 a workshop was held in the Geology Department at Victoria University. The morning session covered modern to Oligocene and older glacial events, and the interaction of these events with the tectonic and volcanic history of the region. This was followed in the afternoon with discussions on dating techniques, the significance of high level alpine glaciations, problems encountered in present investigations, and possible future programmes relating to the antarctic glacial history. (Auth.)

E-30592

Beatty, J.K., **Lunar meteorites: three and counting,** *Sky & telescope,* Sept. 1984 68(3), p.224.

The lunar origins of meteorites found in Antarctica are discussed, and the process of identification of the alien fragments is described. Two of the rocks, the Allan Hills and Yamato-791197, are illustrated. Their chemical composition is given as evidence of their lunar origin, since the proportion of their manganese and iron content, as well as their oxygen ratios, are comparable to those found in lunar highlands rocks.

E-30602

Pereira, M., Pincheira, M., Hoecker, G., **Exploration of mineral zones** [Exploración de zonas mineralizadas], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* Jan.-June 1984 4(1), p.7-14, In Spanish. 14 refs.

Geological and cartographic investigations in the Antarctic Peninsula region are reported, with maps drawn and soil samples taken of the coast and the surrounding islands to determine the location of significant sources of metallic minerals. Eleven such sources are identified and illustrated.

E-30613

Thomson, M.R.A., **Antarctica,** Phanerozoic geology of the world. 2. The Mesozoic, B. Edited by M. Moullade and A.E.M. Nairn, Amsterdam, Elsevier, 1983, p.391-422, Refs. p.416-422.

DLC QE651.P48

This chapter reviews the Mesozoic history of Greater and Lesser Antarctica, and analyzes the geological relationship between them. The literature dealing with the paleogeography of what formed the nucleus of Gondwana and the region which is now an archipelago of continental fragments is discussed. It is concluded that by Late Cretaceous the fragmentation of Gondwana was under way, with Greater Antarctica becoming a continent and Lesser Antarctica retaining its status as an active margin late into Tertiary time.

E-30625

Barron, E.J., Thompson, S.L., Hay, W.W., **Continental distribution as a forcing factor for global-scale temperature,** *Nature,* Aug. 16, 1984 310(5978), p.574-575, 20 refs.

Since the advent of the continental drift hypothesis, changing continental geometries have been proposed as an explanation for long-term temperature variability. Here idealized continental geometries are used as boundary conditions in a simulation using a general circulation model (GCM) of the atmosphere. The range in model simulated globally-averaged surface temperature is 7.4 K with a difference in polar surface temperature of up to 34 K. The simulations suggest a substantial climatic sensitivity to continental positions with the coldest global climate when land masses are in high latitudes. Although the simulations have not captured theoretical limits of climatic variability due to continental positions, present-day geography is near the cold end of this spectrum. (Auth. mod.)

E-30641

Ravich, M.G., **Soviet geological research in the Antarctic,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.165-178, TT 79-52012, For Russian original see 10E-21697.

Soviet geological findings in Antarctica over the past 20 years are reviewed, and a general plan for geological research for the coming 10-12 years is drawn up. (Auth. mod.)

E-30642

Ravich, M.G., **Comparative characteristics of the basement of the Adelaide (Australia) and Ross (Antarctica) geosynclinal regions,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.179-200, TT 79-52012, For Russian original see 10E-21698. 7 refs.

A section of folded basement of the Adelaide geosyncline in Australia is described. This section is compared to the Ross geosynclinal area in Antarctica. There is a marked similarity in the two regions, strong evidence for the existence of the Gondwana supercontinent. (Auth. mod.)

E-30643

Ravich, M.G., Fedorov, L.V., Hofmann, I., **Comparison of the geological structure of southeastern part of India and Sri Lanka with that of Enderby Land, Mac. Robertson Land and Princess Elizabeth Land in East Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.201-221, TT 79-52012, For Russian original see 10E-21699. 46 refs.

This article discusses the geological similarities between southeast Indostan and the central part of East Antarctica, which at times touched or was part of the Gondwana supercontinent. The two areas are identical in terms of the Permian carboniferous deposits, Proterozoic sediments with jaspilites in linearly extended troughs delineated by active faults, and in the crystalline basements. (Auth. mod.)

E-30644

Kamenev, E.I., Ravich, M.G., **Metamorphic facies of Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.222-233, TT 79-52012, For Russian original see 10E-21700. 4 refs.

Current knowledge of antarctic metamorphic facies is reviewed. Mineral associations, thermodynamic parameters of metamorphism and the geological position of metamorphic complexes are discussed. A stratigraphic enumeration of Early Precambrian metamorphic layers is formulated on the basis of a description of metamorphic facies, tectonic features of the crystalline basement and the absolute age of the rocks. (Auth. mod.)

E-30645

Solov'ev, I.A., Grikurov, G.E., **First reports of middle Cambrian trilobites in the Shackleton Range (Antarctica),** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.234-248, TT 79-52012, For Russian original see 10E-21701. 19 refs.

During geological field studies of the 21st SAE in the Shackleton Range, ptychopariid trilobites from the Middle Cambrian were found. The hypothesis that the deposits containing this fauna were laid down stratigraphically above the metamorphic basement but below the sediment layer from the Blaiklock glacier is offered. A list of the trilobites and descriptions are given. A biostratigraphic correlation of these layers with those of the same age on other continents is included. (Auth. mod.)

E-30648

Miagkov, S.M., **Geomorphological map of Antarctica to the scale 1:15,000,000,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.268-274, TT 79-52012, For Russian original see 10E-21704. 26 refs.

A new geomorphological map of Antarctica was compiled as part of a world map prepared by the geomorphology group of the Moscow State University geography department. Geomorphology of subglacial areas is shown based on geophysical, geological and other data gathered over the past 20 years. As an example, a simplified fragment of the map with an abbreviated legend is included. (Auth. mod.)

E-30656

Thomson, M.R.A., **"European" ammonites in the Lower Cretaceous of Antarctica,** *Zitteliana,* July 1, 1983 Vol.10, p.407-412, With German summary. 35 refs.

Lower Cretaceous sedimentary rocks in southeastern Alexander Island contain a variety of ammonites which bear striking similarities to European species. Two groups, one dominated by small heteromorphs and the other by non-heteromorph species, occur side by side in the same rock sequence and yet seem to indicate stratigraphical ages that differ by approximately one stage. Aconeceratids, eotetragonitids and some large heteromorphs favor an early Aptian-early Albian age that is generally consistent with the normally accepted ranges of associated bivalve and belemnite genera. However, acrioceratids, crioceratids and silesitids closely parallel the faunal succession seen in Europe and suggest a late Hauterivian-late Barremian age for the same 1200 m thick part of the succession. Although the younger age has been favoured in recent geological literature on the area, there appears to be no independent evidence which might resolve the problem conclusively. (Auth.)

E-30660

Crame, J.A., **Lower Cretaceous bivalve biostratigraphy of Antarctica,** *Zitteliana,* July 1, 1983 Vol.10, p.399-406, With German abstract. 39 refs.

A preliminary sequence of inoceramid and buchiid bivalves can now be established for the Lower Cretaceous of Antarctica. On Alexander Island the Berriasian *I. ovatus* group is succeeded by the *neocomiensis, concentricus* and *anglicus* groups, which collectively have a Barremian-Albian age-range. The *neocomiensis* and *concentricus* groups are also present on James Ross Island. Valanginian-

Barremian *Inoceramus* species are poorly represented, but there are records of both the *I. heteropterus* group and *I. cf. anomiaeformis* (Hauterivian-Barremian) from Annenkov Island. The lack of any Lower Cretaceous *Buchia* species in Antarctica may be further evidence of a stratigraphic hiatus during part of the Neocomian. There are, however, many Barremian-Albian buchiids referable to the genus *Aucellina*. The *A. andina-radiatostriata* group is of particular importance as it occurs in all the major basins of deposition and can be used for local correlations. A further characteristic element of Antarctic Lower Cretaceous faunas is the genus *Anopaea*. Its apparent confinement within the Southern Hemisphere to the Antarctic region indicates that at least some inoceramids had a much more restricted distribution. (Auth.)

E-30692

Canfield, D.E., Green, W.J., **Aspects of nutrient behavior in Lake Vanda,** *Antarctic journal of the United States,* 1983 18(5), p.224-226, 15 refs.

In an effort to determine what role nutrient limitation might play in controlling Lake Vanda's biological productivity and to consider, in general, the dynamics of nutrient behavior within the Vanda-Onyx system, a study was undertaken in which lake waters were analyzed for nitrate, nitrite, ammonia, total phosphorus, and dissolved orthophosphate. The Onyx River, Lake Vanda's major input stream, was sampled 23 times throughout the flow season and was also analyzed for the same nutrients, as well as for condensed phosphate. These data were used, along with 12 years of Onyx River flow data collected by the New Zealand Ministry of Works, to calculate residence times for various nutrient species in the region above the chemocline. The results suggest that productivity in Lake Vanda is limited by low areal phosphorus loads from the Onyx River and by the absence of phosphorus recycling within the lake. The relative abundance of water column nitrogen can be attributed to nitrogen "pumping" from the anoxic brine into the water above.

E-30726

Furnes, H., **Basalts in the Kraul Mountains and the history of Gondwanaland** [Basaltene i Vestfjella og Gondwanalands historie], *Naturen,* 1978 102(6), p.243-250, In Norwegian.

During the Norwegian Antarctic Expedition 1976/77 field investigations and samplings were undertaken of volcanic sequences and rocks of basaltic composition in Vestfjella, Queen Maud Land. The samples were dated and subjected to geochemical analysis. Results of the investigation are summarized and compared with findings in other Gondwanaland continents. Diagrams of the splitting up of Gondwanaland are shown.

E-30727

Løvlie, R., **What remanent magnetism in the Kraul Mountains can tell us** [Hva den fossile magnetiseringen i Vestfjella kan fortelle], *Naturen,* 1978 102(6), p.251-255, In Norwegian.

Results of measurement of remanent rock magnetism in Vestfjella, Queen Maud Land, during the Norwegian Antarctic Expedition 1976/77, are briefly reported. Magnetic pole positions derived from the measurements, and the splitting up of continents are shown in schematic diagrams.

E-30729

Haugland, K., **Seismic studies in the Weddell Sea** [Seismikk i Weddellhavet], *Naturen,* 1978 102(6), p.265-270, In Norwegian.

After an introduction of the splitting up of Gondwanaland and the tectonic structure of Antarctica, seismic reflection studies made in the Weddell Sea during the Norwegian expedition in 1977 are reported and several of the profiles obtained are presented. Large areas of the Weddell Sea bottom are found to be covered by sedimentary rocks of considerable thickness. This suggests that the area may eventually be of interest as a source of minerals, even though its exploitation is not feasible under present circumstances.

E-30732

Maisey, G.H., **Antarctica, icebergs and sea level** [Om Antarktis, isfjell og havnivå], *Naturen,* 1978 102(6), p.281-284, In Norwegian.

Studies of the Weddell Sea bottom made during the 1977 Norwegian expedition, using side-looking sonar, are reported, and examples of the patterns obtained are shown. The technique is found suitable for studying striations made by icebergs, which are indicative of sea level changes since Quaternary time.

E-30736

Feldman, R.A., **Seymour Island yields a rich fossil harvest,** *Geotimes,* May 1984 29(5), p.16-18.

A brief review is given of the diversity and quantity of fossil forms, prior and most recent fossil collecting expeditions to the island, the physical setting, and the assemblages gathered during the 1983-84 visit.

E-30737

Miotke, F.-D., **Slope morphology and slope-forming processes in South Victoria Land, Antarctica,** *Polar geography and geology,* Jan.-Mar. 1984 Vol.8, p.1-53, 62 refs. For German original see 37-4043 or 13E-28398.

Slope-forming processes in South Victoria Land occur under the most severe climatic conditions. Very low temperatures are combined with extreme aridity which rarely permits surface runoff. In contrast to the situation in arctic regions, slope erosion and solifluction contribute little to the slope morphology. The possible morphological processes involved in soil creep under the special conditions of Victoria Land are presented and discussed. Thermal contraction and expansion caused by the wide temperature fluctuations are demonstrated by the widespread occurrence of polygons and by "inner rock polygons" within rock fragments. Movements are aslo initiated in the cover of fine materials by the crystallization of both ice and salt; when gravity is superimposed on these, downslope displacements result. Snow loading and snow thrusting locally reinforce the effects of dry solifluction. The almost universally developed deflation pavements provide proof of the role of eolian transport on the slopes. Only estimates of the rates of soil creep in Victoria Land are possible at present. In general it appears that the aridity of the Dry Valleys is less of an impediment to weathering processes than to slope denudation. (Auth. mod.)

E-30745

Fleming, E.A., comp, Harris, J.S., comp, Thompson, J.W., comp, **British Antarctic Territory geological map, scale 1:500,000; South Orkney Islands, with South Georgia and South Sandwich Islands,** Cambridge, England, British Antarctic Survey, 1984, 1 sheet, 63 refs.

The map, identified as Series BAS 500 G, Sheet 1, Edition 1, is drawn to a scale of 1:500,000 and is composed of four insets, three of which show color-coded characteristic geology of each entity and a fourth showing the geographic relationships of each with the others. The text identifies the geologic periods of various rock formations on each island or island group. These are color-coded to the appropriate locations on the insets. A sub-inset on the South Georgia inset shows four north-south topographic cross-sections of the island. Other insets include the index sheet to the region, topographic symbols, scales for statute and nautical miles and kilometers, a base map compilation diagram with topographic and bathymetric sources, and the geological symbols used.

E-30765

Wand, U., **Geological observations in the Schirmacher Oasis, Queen Maud Land (preliminary contribution)** [Geologische Beobachtungen in der Schirmacher Oase, Königin-Maud-Land, Ostantarktis (vorläufige Mitteilung)], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.85-89, In German with English and Russian summaries.

Geological field observations in the oasis by a member of the GDR group during the 25th SAE in 1980-1981 are reported. The metamorphic rock sequence exposed in the Schirmacher Oasis consists of alternating layers of various, in part magmatitic, gneissic rocks and pyroxene schists with biotite and garnet. Sillimanite schists and granitic gneisses are found in lesser amounts. Thin lenticular beds of marbles, calcsilicate rocks, and ultramafic rocks also occur. Small dikes of pegmatite, aplite, quartzite and biotite amphibolite are found throughout the study area. Distinctly younger (Mesozoic?) dikes of basaltic and doleritic rocks cut the crystalline basement. The mineral assemblages of metamorphic rocks indicate that a granulite facies metamorphism was followed by an amphibolite facies event. The tectonic setting is characterized by the occurrence of various types of folding structures, faults (blastomylonites), and fractures in many places. Evaporite salts, dominantly calcite and gypsum, are widely distributed as encrustations or efflorescences on the rock surfaces. Petrographic examinations, geochemical and stable isotope studies, and radiometric dating of various rock types are in progress. (Auth.)

E-30780

Tatur, A., Myrcha, A., **Ornithogenic soils on King George Island, South Shetland Islands (Maritime Antarctic zone),** *Polish polar research,* 1984 5(1-2), p.31-60, With Russian and Polish summaries. 32 refs.

Analysis of ornithogenic soils being formed around rookeries of krill-eating pygoscelid penguins on an elevated volcanic island in the Maritime Antarctic zone is reported. The profiles in the bird colony and in its close proximity are described, explored chemically and characterized mineralogically, especially in the zone of deep metasomatic phosphatization of stony and clayish weathered covers. The semantics of ornithogenic soils is discussed in terms of their genesis and morphology as well as the dependence of phosphatization with species selectivity of breeding sites of the pygoscelid penguins. (Auth.)

E-30781

Tatur, A., Barczuk, A., **Phosphates of ornithogenic soils on the volcanic King George Island (Maritime Antarctic),** *Polish polar research,* 1984 5(1-2), p.61-97, With Russian and Polish summaries. 60 refs.

Analysis of minerals found in penguin guano and in underlying silicate weathering crust phosphatized by guano leachates are reported. Struvite and hydroxylapatite are found in guano; leucophosphite, minyulite, amorphous aluminum phosphate and taranakite, in phosphatized layers, and at some distance from the zone of ornithogenic soils, vivianite. Minerals are identified by X-ray analysis and results of this identification are confirmed by microscope studies and the analysis of chemical composition. Results of the thermogravimetric analysis of the selected minerals occurring in monomineral agglomerations (struvite, minyulite, amorphous aluminum phosphate, taranakite) are also presented. Relation between distribution of those minerals in ornithogenic soils and changes in chemical composition of mineral-forming guano leachates during their infiltration through soil, are described. (Auth.)

E-30799

Ravich, M.G., Solov'ev, D.S., Fedorov, L.V., **Geological structure of Mac. Robertson Land (East Antarctica),** New Delhi, Amerind Publishing Co., 1984, 254p., For Russian original see 10E-20600. 59 refs.

The book summarizes the geological studies carried out in 1971-1974 (as part of the Soviet Antarctic Expedition) in Mac. Robertson and Princess Elizabeth Lands, East Antarctica. The area under study is the East Antarctic craton where, along with the Archean crystalline basement, within narrow troughs of thickly folded Proterozoic formations, and in grabens, Permian coal-bearing deposits were recognized. The tectonic structure of the region allowed identification of a continental rift zone possibly filled in with Meso-Cenozoic rocks. The data concerning metamorphic and igneous rocks, as well as analyses of all the facies of regional metamorphism and a diagram of intrusive unit development, are provided. (Auth.)

E-30805

Hofmann, J., Paech, H.-J., **Geological activities carried out by the GDR in Antarctica,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.24-28, With German and Russian summaries.

German geological expeditions of the 19th and early 20th centuries were directed mainly toward sub-antarctic islands. As the GDR participated more and more in the SAE, geological explorations concentrated on numerous points in East Antarctica and rocks and formations were dated. Pictures of some of the explored regions are included.

E-30827

Paech, H.-J., **GDR geologists in Antarctica** [DDR-Geologen in der Antarktis], *Urania,* 1984 60(8), p.64-67, In German.

An account is given of the geological program undertaken in the general region of the Schirmacher Ponds. This includes studies in geomagnetism, isotopic chemistry, geomorphology, and hydrology. Geologic mapping of a 20 km portion of the oasis region was also included. Geochronological studies were conducted in the Pensacola Mountains and relationships between Antarctica, southern Africa, India, and Australia were clarified vis à vis Gondwanaland. Modern equipment and transport allowed the studies to proceed smoothly.

E-30835

Kent, L.E., Gribnitz, K.-H., **Problematical Quaternary successions on Marion Island: volcanogenic or glacigenic,** *South African journal of antarctic research,* 1983 Vol.13, p.15-23, In English with Afrikaans summary. 19 refs.

The successions in the cliffs at Macaroni Bay and Ship's Cove, regarded by a previous worker as glacigenic, with tills of three different ages, are on geological, petrographical and mineralogical evidence considered here to be volcanogenic. Tuff breccias predominate. They are thought to be sub-aqueously deposited debris flows originating from terrestrial volcanoes. Intercalated thin, very well-bedded layers of fine, originally glassy, volcanic ash and lapilli represent air-fall ejecta. A red bed reported to be a fossil soil that formed during a warm, humid interglacial is, on the grounds of its fine bedding, the presence of unweathered clasts, volcanic bombs and lapilli, and the absence of clay minerals, considered to be a volcanic ash. The successions, measured sections of which are described, are formally named the Ship's Cove Breccia Formation. The relief in the cliffs due to the projection of rock fragments is attributed to salt-spray induced preferential removal of the fine-grained ash matrix. (Auth.)

E-30838
Hall, K., **Observations of some periglacial features and their paleoenvironmental implications on sub-Antarctic islands Marion and Kerguelen,** *South African journal of antarctic research,* 1983 Vol.13, p.35-40, In English with Afrikaans summary. 25 refs.

Some quantitative data on patterned ground for the sub-Antarctic islands Kerguelen and Marion are presented. Some features are recognised as fossil and of being a product of cooler than present post-glacial conditions. The present-day sorting is smaller in scale than that produced immediate upon deglaciation. The periglacial features thus record the environmental change since the disappearance of the ice cover. (Auth.)

E-30845
Zenkov, V.N., Mikhal'skiĭ, E.V., Mikhaĭlov, V.M., Mozheĭko, S.IU., Fedorov, L.V., **Preliminary results of geological investigations made during the 27th Soviet Antarctic Expedition** [Predvaritel'nye rezul'taty geologicheskikh issledovaniĭ, provedennykh v Dvadtsat' sed'moĭ Sovetskoĭ antarkticheskoĭ ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.11-16, In Russian. 2 refs.

The 27th Soviet Antarctic Expedition's geological study covers about 3000 sq. km. of the Antarctic Peninsula. Of the Copper Nunataks investigated, 25, located in the granodiorites of the western half of the peninsula, show copper mineralization of the porphyry copper class of Andean type. The significance of the presence of granitoids on Lassiter Coast, along the intensely disturbed, Jurassic, vulcanogenic strata of tectonic, rather than intrusive, type of rocks is pointed out.

E-30864
Samsonov, V.V., **Age of folded rocks of Pensacola Mountains (West Antarctica)** [O vozraste skladchatykh tolshch v gorakh Pensakola (zapadnaia Antarktida)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.12-19, In Russian. 6 refs.

The rock series in the Neptune Range of the Pensacola Mountains include terrigenic layers, found in the Schmidt and Williams Hills, with deformities identical to those in the Patuxent series, a diabase-sandstone-aleurolite formation of probably young precambrian age. Geochronological data from American studies are reviewed. Microscopic analysis of sedimentary rocks from Pepper Peak revealed foraminiferal remnants; photographs of same, and tentative identification, are presented.

E-30865
Beliaev, K.R., **Main features and criteria of organic substance distribution in the rocks of Lassiter Coast** [Kharakter i kriterii raspredeleniia organicheskogo veshchestva v porodakh berega Lassitera (Antarkticheskiĭ poluostrov)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.19-26, In Russian. 4 refs.

Field studies conducted by members of the 26th Soviet Antarctic Expedition, in a 15 thousand sq. km area of the Latady, Scaife, and Wilkins Mountains, are reported. A chart of the geological formations of the southern portion of Lassiter Coast is presented. The age is determined as Middle-Upper Jurassic. Rock contents of carbons and chloroformic bituminoids, and the chemical composition, are tabulated.

E-30871
Strauch, G., Maass, I., Runge, A., Mühle, K., Hendel, D., **Isotopic variations of hydrogen, carbon and nitrogen in the lower plant forms of the Schirmacher Ponds (East Antarctica)** [Izotopnye variatsii vodoroda, ugleroda i azota v nizshikh rasteniiakh oazisa Shirmakhera (Vostochnaia Antarktida)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.54-59, In Russian. 11 refs.

Results of isotope studies of lichens, mosses and algae of the Schirmacher Oasis are given and peculiarities of the habitats which influence the isotope contents of the plants are discussed.

E-30903
Wada, E., Imaizumi, R., Nakaya, S., Torii, T., **N-15 abundance in the Dry Valley area, South Victoria Land, Antarctica: eco-physiological implications of microorganisms,** *Tokyo. National Institute of Polar Research. Memoirs,* August 1984 Special issue No.32, p.130-139, 19 refs.

Stable nitrogen isotope ratio in nitrogen-bearing substances from the Dry Valley area, south Victoria Land, is reported. The lowest delta N-15 value of around -50 per mill was found for the epibenthic algae collected from nitrate-rich saline ponds in the Labyrinth. In Lake Vanda, nitrate in its maximum layer (57-59 m) was significantly rich in N-15 (10.3-13.4 per mill) as compared with the sedimentary organic nitrogen (-4.6 per mill). The variation of delta N-15 probably results from nitrogen isotope fractionation associated with nitrate assimilation by algae. In the east lobe of Lake Bonney, the delta N-15 value in nitrate increased with depth from 4.9 to 31.2 per mill. Dissolved N2 gas in the west lobe exhibited the highest delta N-15 value (1.5-2.5 per mill) among those observed in anoxic layers of various aquatic systems. The latter results from denitrification of nitrate with high delta N-15 value at temperatures lower than 0 C. (Auth.)

E-30908
Nagata, T., ed, **Proceedings of the Fourth Symposium on Antarctic Geosciences, 1983,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, 240p.

The Symposium was held on October 28 and 29, 1983 at NIPR, Tokyo. The volume contains 20 full scientific papers and 7 abstracts, dealing with geology, petrology, geomorphology, geophysics and geochemistry of Antarctic regions. For individual papers see 39-1086 through 39-1094 or E-30912, E-30915 through E-30922, E-30924 through E-30929, F-30910, J-30923, L-30909, L-30911, L-30913 and L-30914.

E-30912
Ueki, S., Kaminuma, K., Baba, M., Koyama, E., Kienle, J., **Seismic activity of Mount Erebus, Antarctica in 1982-1983,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.29-40, 13 refs.

Since December 1980 the seismic activity of Mount Erebus has been continuously monitored using a radio-telemetered network of six seismic stations. A 50-day temporary seismic observation was also carried out in the 1982-1983 Antarctic field season. The following seismic activities were observed during this field season: Explosion earthquakes accompanied by Strombolian eruptions from the lava lake occurred at a rate of 0-4 times per day which is slightly lower than the rate in the previous season; an intense earthquake swarm, which is possibly related to the underground movement of magma, occurred on October 1982 near Abbott Peak, 10 km northwest of the summit; there were other source regions of seismicity on Ross Island, fairly distant from Mount Erebus to the east. (Auth.)

E-30915

Moriwaki, K., **Preliminary surveys of the antarctic continental shelf by a seismic profiler in Amundsen Bay and Lützow-Holm Bay,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.61-65, 4 refs.

Preliminary sonic prospecting by a sparker system was carried out on the Antarctic continental shelf on board the icebreaker *Fuji.* A ridge which seems to be a drowned lateral moraine was found in Amundsen Bay. The broad rise north-northwest of the Ongul Islands is identified as an erosional surface, at least its northern part. (Auth.)

E-30916

Sato, S., Asakura, N., Saki, T., Oikawa, N., Kaneda, Y., **Preliminary results of geological and geophysical surveys in the Ross Sea and in the Dumont D'Urville Sea, off Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.66-92, 16 refs.

Geological and geophysical surveys in the Ross Sea and Dumont d'Urville Sea, in the 1982-1983 Antarctic summer season, confirmed the presence of two large basins. The six-fold seismic reflection profiles indicate seven depositional sequences, which consist mainly of deltaic sediments with admixed glacial sediments in the Eastern Basin. Similar sediments were deposited in a graben structure in the Central Basin. The seismic reflection and refraction data suggest the presence of sediments of pre-Late Oligocene age in the deeper parts of the two basins beneath the Ross Sea. Four strata in the basin of the Dumont d'Urville Sea are interpreted from reflection data. They were formed by seafloor spreading associated with rifting between Wilkes Land and South Australia. Seismic refraction indicates a maximum sedimentary thickness in excess of 5 km. The age of the acoustic basement may be older than Late Oligocene. (Auth. mod.)

E-30917

Ohmae, H., Nishio, F., Ishikawa, M., Takahashi, S., **Identification of bedrock types beneath the ice sheet by radio echo sounding in the bare ice field near the Yamato Mountains, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.95-102, 5 refs.

From Dec. 1982 to Jan. 1983 an oversnow traverse party of the 23rd JARE took photographs of A-scope recorder every 1 km along the traverse routes. The reflection intensity of the radio echo signals from the ice/bedrock interface was calculated by correcting the effect of the attenuation loss of electromagnetic waves within the ice sheet. Dielectric constants of the rocks were measured in a frequency range from 3 to 50 MHz and gave values which varied from 2 to 5. To identify bedrock types beneath the ice sheet in the bare ice area, the reflection intensity of the bedrock is compared with the echo strength calculated from the measured dielectric constant of rock samples. It is found that the bedrock is granitic gneiss in the region near Massif A of the Yamato Mountains, and there are a few areas along the traverse route where the bedrock gives a strong echo between -10 and -20 dB. (Auth.)

E-30918

Motoyoshi, Y., Matsueda, H., **Archean granulites from Mt. Riiser-Larsen in Enderby Land, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.103-125, 51 refs.

Mt. Riiser-Larsen, a part of the Napier Complex in the East Antarctic Shield is underlain by the Archean granulites formed under pyroxene granulite-facies conditions. Characteristic mineral associations of sapphirine + quartz, orthopyroxene + sillimanite + quartz and garnet + sillimanite + quartz, all of which are breakdown products after cordierite, have coexisted stably at the peak of metamorphism. The variety of these mineral associations would be largely attributed to the chemical compositions of the rocks, namely the Mg/Fe ratio. On the basis of the phase relations determined experimentally and/or theoretically, and with the use of geothermometers and geobarometers, the P-T conditions at the peak of metamorphism are estimated to have been around 900 deg C, 8-10 kbars. On the other hand, water pressure must have been considerably lower than total pressure, which is suggested by the absence of migmatitic facies and hydrous phases in the mineral assemblages. (Auth.)

E-30919

Shiraishi, K., Hiroi, Y., Onuki, H., **Orthopyroxene-bearing rocks from the Tenmondai and Naga-iwa rocks in the Prince Olav Coast, East Antarctica: First appearance of orthopyroxene in progressive metamorphic sequence,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.126-144, 35 refs.

Field occurrence and detailed petrography of three orthopyroxene-bearing rocks from bedrock exposures are presented in this paper. The mineral compositions as well as mineral textures suggest that the rocks are close to chemical equilibrium, that orthopyroxene was first produced in such manner (order) as is predicted experimentally and theoretically, and that the chemical compositions of the calcic amphiboles coexisting with orthopyroxene can be indicators of metamorphic grade. (Auth.)

E-30920

Suzuki, M., **Reexamination of metapelites in the Cape Omega area, westernmost part of Prince Olav Coast, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.145-154, 10 refs.

Through the reexamination of metamorphic rocks in the Cape Omega area, the associations of orthopyroxene-garnet-biotite and cordierite (mg=0.95)-sillimanite-biotite (mg=0.92) are found in some kinds of metapelites. Based upon the petrographical and mineralogical investigations of the rocks, it is clarified that metamorphic conditions of the area were around 680 C and 5 kb. (Auth.)

E-30921

Katsushima, T., Yanai, K., **Geology of several islands to the west of Langhovde, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.155-168, 11 refs.

Seven main islands and their neighboring islets are situated at 69 deg 08'-69 deg17'S and 39 deg 24'-39 deg 36' E. The basement rocks exposed in this region are classified as follows: (1) metabasite, (2) pyroxene gneiss, (3) garnet-biotite gneiss, (4) garnet gneiss, (5) leucocratic biotite gneiss, (6) pegmatite. The gneissic rocks have been subjected to granulite facies metamorphism and are correlated with the Ongul Group of the Lützow-Holm Bay System. Their folding axes in this region trend northwest like those in the Langhovde region. (Auth.)

E-30922

Katsushima, T., **Geology of the Minami-Yamato Nunataks, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.169-181, 10 refs.

The Minami-Yamato Nunataks are situated at 71.9-72.1 S and 35.1-35.3 E, 40 km southwest of the Yamato Mountains. Basement rocks exposed in this area are classified as follows: Granitic gneiss, Hornblende-biotite gneiss, Clinopyroxene-biotite gneiss, Basic dikes, Acidic dikes. The gneissic rocks subjected to amphibolite facies metamorphism were intruded by various dike rocks, which are subdivided into basic dike I, acidic dikes, basic dike II in order of their emplacement. Basic dike rocks were also metamorphosed. On the basis of their modes of occurrences and petrographic features it can be concluded that the rocks composing the Minami-Yamato Nunataks are correlated with those of Massifs B and C in the Yamato Mountains. (Auth.)

E-30924

Murayama, H., Watanuki, K., Nakaya, S., Torii, T., **Monitoring of pond waters near Syowa Station (II),** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.187-193, For Part I of this study see 12E-25878. 2 refs.

Water samples collected in 1981 and 1982 were analyzed from the geochemical and environmental viewpoints. The water samples were collected from five lakes which have been selected as monitoring stations since 1978. Comparing the data obtained in this work with available previous data, the authors point out the results as follows. Five lakes selected in 1978 were found suitable as monitoring stations. Chemical compositions and dissolved salts in Lake Nurume and Lake Hunazoko have not changed markedly in the last fifteen years. The amount of dissolved salts in three lakes has changed considerably. (Auth.)

E-30925

Masuda, N., Nakaya, S., Torii, T., **Origin of salt in antarctic saline lake waters through trace element analysis,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.194-203, 21 refs.

The origin of trace elements in Antarctic saline lake waters is still not clear. Waters of five Antarctic saline lakes and ponds in the Wright Valley and the Taylor Valley, and one coastal glacier ice were analyzed by the neutron activation method. Three possible origins, connate sea water, rock weathering and tropospheric aerosol particles, were investigated. The correlations of chemical constituents between the South Pole aerosol particles and the lake and pond waters indicate that trace elements in the antarctic saline lake and pond waters might have been derived mostly from aerosol particles. (Auth.)

E-30926

Matsumoto, G.I., Torii, T., Hanya, T., **Review of organic geochemistry in Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.204-217, 36 refs.

Organic constituents of the McMurdo, Showa and Vestfold regions have been reviewed with the viewpoint of organic geochemistry. The concentrations of total organic carbon (TOC), extractable organic carbon with ethyl acetate, total nitrogen (TN), hydrocarbons, fatty acids, sterols, hydroxy acids and phenolic acids in lake and pond waters and sediments show a wide range of variation depending on the sampling depths and locations, reflecting probably the difference of the distribution and activity of organisms there, although the contents of the organic compounds studied are generally low. Normal, branched and unsaturated hydrocarbons and fatty acids are found in the water and sediment samples, but their compositions differ considerably among the lakes and ponds. The concentrations of TOC, TN, hydrocarbons and fatty acids in soils in the Dry Valley areas of the McMurdo Oasis are extremely low, reflecting that organic carbon sources are highly restricted there. However, very long-chain n-alkanoic acids extending to C40 are found, having a small even-carbon predominance, and comprising a large proportion of the fatty acids in soils. They apparently originate in the Beacon sandstone. (Auth. mod.)

E-30927

Komura, K., Torii, T., Yanagisawa, M., Sakanoue, M., **Th-230/U-234 chronology of mirabilite from Cape Barne in Ross Island, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.218-223, 18 refs.

Th-230/U-234 method was applied for the dating of a mirabilite collected from Cape Barne in Ross Island, Antarctica. The age of the mirabilite was estimated to be 4700 y. The U-234/U-238 activity ratio was 1.23 which is concordant with the sea water origin of this mineral. Mean uplifting rate of the ground level in the Cape Barne area was estimated to be 5 mm/y from the Th-230/U-234 age and the altitude of the sampling point. (Auth.)

E-30928

Komura, K., Torii, T., Yamamoto, M., Sakanoue, M., **Natural and artificial radionuclides in environmental samples collected from the McMurdo Sound region,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.224-236, 15 refs.

Natural and artifical radionuclides in the soils collected from Ross Island and the Dry Valleys area and water filters used at the Scott Base have been studied by non-destructive gamma and alpha-spectrometry. The U, Th and K contents in the soils from Cape Royds were found to be several times higher than those from the Dry Valleys area, while the K/Th and U/Th ratios were nearly the same independent of the sampling location. Accumulation of Cs-137 in surface soils was estimated to be 1-5 mCi/sq km, which is one to two orders of magnitude lower than those measured for the surface soils in Japan. In spite of the great difference of the fallout accumulation in surface soil, the Pu-239,240/Cs-137 activity ratio (0.016-0.022) was almost the same as the global fallout value. (Auth. mod.)

E-30929

Nakaya, S., Torii, T., Yamagata, N., Murata, S., **Hydrogeochemical study of Don Juan Pond in the dry valleys area south Victoria Land, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.237-240, 4 refs.

The course of research development of the waters of Don Juan Pond since its discovery in 1961 is reviewed. The major research problem of this lake is the attempt to determine the source of its high salinity. Numerous hypotheses have been proposed; none has been conclusively demonstrated.

E-30930

Clapperton, C.M., Sugden, D.E., **Geomorphology of the Ablation Point massif, Alexander Island, Antarctica,** *Boreas,* 1983 12(2), p.125-135, 12 refs.

A coloured geomorphological map at the approximate scale of 1:50,000 is presented for the Ablation Point massif area. The main geomorphological features are described, such as ice and snow cover, glacial landforms and deposits (and chronology), ice marginal lakes, melt pools, gelifluction landforms and patterned ground and valley-slope landforms. The area is thought to be a good analogue for glacial age maritime northwest Europe. (Auth.)

E-30932

Shellhorn, M.A., **Role of crustal contamination at the Butcher Ridge Igneous Complex, Antarctica,** Socorro, New Mexico Institute of Mining and Technology, 1982, 169p., M.S. thesis. Refs. p.162-169.

The Butcher Ridge Igneous Complex (BRIC) of the Ferrar Dolerite Group exhibits a greater chemical diversity than previously recorded. Compositions range from tholeiitic basalt through rhyolite. White Apron Spur represents the most complete stratigraphic section at the BRIC. Vitrophyres are common in the high-K dacites and high-K rhyolites. Samples exhibit elemental and isotopic compositions requiring an origin of melting or partial melting of crustal material. (Auth. mod.)

E-30936

Fröhlich, F., **Amorphous iron silicates neoformation in recent pelagic sediments** [Néoformation de silicates ferrifères amorphes dans la sédimentation pélagique récente], *Bulletin de minèralogie,* 1980 103(6), p.596-599, In French with English summary. 13 refs.

DLC QE351.S6

A high proportion of amorphous silicates is present in recent pelagic sediments from the Crozet Basin, as shown by IR analysis. According to their structure, neoformation of these silicates is consistent with the existing deep-sea environment. (Auth.)

E-30938

Dalziel, I.W.D., **Scotia Arc: an international geological laboratory,** *Episodes,* Sep. 1984 7(3), p.8-13, 37 refs.

The Scotia arc is the eastward closing loop of mountains, submarine ridges and islands that joins South America to Antarctica. This review of the geology of the region, as established through recent national and international programs, demonstrates the potential of the Scotia arc for furthering understanding of geological processes and the evolution of the southern continents and oceans. (Auth.)

E-30962

Cassidy, D.S., **Antarctic marine geology research facility and core library, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.290-291, 19 refs.

A chronicle of the year's activities (1 June 1982 to 31 May 1983) by staff of the Antarctic Marine Geology Research Facility and Core Library is primarily a record of the distribution of samples, the receipt and processing of new materials, and core-describing. During this period, a total of 2,161 samples were distributed to 17 investigators representing 12 institutions in Japan, Sweden, and the United States. Sample sources included *Eltanin, Islas Orcadas,* IWSOE, Deep Freeze 1980, 1981, and 1982, RISP, and DVDP. A total of 179,811 samples have been removed, recorded, and distributed from the FSU collection since the beginning of the program in 1962. A major effort of the year's program involved the transfer, on loan, of more than 1 metric ton of sediment to project scientists at Rice University for onsite analyses and whole-core X-radiography. New acquisitions are described. The twelfth volume in a series of core descriptions of Deep Freeze sediments was printed and distributed.

E-30963

Cassidy, D.S., **IWSOE and Operation Deep Freeze: a curatorial review of the sediment collections,** *Antarctic journal of the United States,* 1983 18(5), p.292-294, 8 refs.

This review summarizes a collection of piston, trigger, and Phleger cores and grabbed, trawled, and dredged specimens retrieved since 1968 from bottom sediments of the antarctic continental margin and shelf seas aboard 10 cruises of USCGC *Glacier* and one cruise of USCGC *Burton Island.* Projects (since 1968) from which specimens have been received are those of the International Weddell Sea Oceanographic Expeditions (IWSOE) of 1968, 1969, 1970, and Operations Deep Freeze 1975 (Amundsen Sea), 1976 and 1978 (Ross Sea), 1979 (Dumont d'Urville Sea), 1980 (western Ross Sea), 1981 (Bransfield Strait and Amundsen Sea), 1982 (northern Antarctic Peninsula), and 1983 (Ross Sea-Sulzberger Bay area). Operation Deep Freeze 1975 was carried out aboard *Burton Island;* all other projects used *Glacier.* To May 31, 1983, 5,383 samples have been distributed from the IWSOE and Deep Freeze collections. Three volumes of sediment descriptions have been completed for project materials and a fourth is in preparation for sediments recovered during Deep Freeze 1982. A comprehensive bibliography of publications, including theses, dissertations, and core description volumes concerned with the results of analyses performed upon samples that have been distributed from IWSOE and Deep Freeze sediments, has been prepared.

E-30980

Heywood, R.B., **Antarctic inland waters,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.279-344, Bibliography p.332-344.

DLC QH84. .A58 1984

Although Antarctica as a whole is classed as a cold desert, water bodies do occur and these are discussed. The evolution of antarctic lakes is shown in the proglacial lakes, freshwater lakes, Signy Island lakes, Vestfold Hills lakes, dry valleys lakes, and others. Biological research in antarctic lakes is a relatively new activity with few production measurements to gauge reproduction success. The flora, microflora, and fauna of the lakes are discussed.

E-30994

Setty, M.G.A.P., **Ostracoda from Vestfold Hills lake terraces, Antarctica,** *Geological Society of India. Journal,* 1984 25(6), p.375-384, 20 refs.

Six species of ostracodes are recorded from two transects of terraces of Deep Lake, Vestfold Hills. In aggregate they range from Cretaceous to Recent. *Bradleya dictyon* and *Krithe tumida* were typical deep water (psychrospheric) forms during Paleocene to Oligocene as today but they were found in shallow (-45 to -37 m) depths here. Ostracodes are extremely rare as compared to the associated foraminiferal assemblage. Dissolution effect, loss of ornamentation, thinning and fragmentation of the fauna are considered to be mainly due to gradational external stress, and large scale physical environmental shifts such as high salinity, low temperature and high dissolved carbon dioxide content of the Deep Lake waters. Disparity in abundance is attributed to wind erosion, differential deposition after ablation of ice from ice sheets, physiographic variation of the region and high rate of dissolution of calcareous forms including foraminifera. (Auth.)

E-30996

Chinn, T.J., Maze, I., **Hydrology and glaciology dry valleys, Antarctica annual report for 1980-81,** *New Zealand. Water and Soil Science Center. Report,* Mar. 1983 WS 900, 64p.

This programme investigates long and short-term climatic fluctuations in the dry valleys region by the study of glaciers, summer meltwater streams and the levels of enclosed lakes. This report presents technical details of the work covered, methods used, problems encountered and the results obtained over the 1980-81 summer. Flows were recorded at two sites on the Onyx River. Lake Vanda rose by 0.212 m. Levels of other enclosed lakes changed by small amounts over the summer, 6 showed small rises, while 3 fell. Levels fell in all but Lake Bonney over the calendar year ending Jan. 1981. This season, Don Juan Pond, a strongly saline pond not known to freeze in winter, was included in the lake level studies. Ice ablation and thickness measurements were continued on Lake Vanda. Ablation measurements of glacier snouts were continued on three glaciers, together with mass balance measurements on Heimdall Glacier. Studies of the coupling zone between glacier ice and lake ice where a glacier enters a lake were initiated at two sites, one at Wright Lower Glacier and Lake Brownworth and the other at Taylor Glacier and Lake Bonney. Surface and sub-surface ice types were studied and both sites ice-core drilled and samples studied in thin-section. (Auth. mod.)

E-30997

Marvin, U.B., ed, Mason, B., ed, **Field and laboratory investigations of meteorites from Victoria Land, Antarctica,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, 134p., Refs. passim. For individual papers see E-30998 through E-31007.

DLC QE1.S227

This monograph describes the meteorite collecting activities in Victoria Land during the 1980-1981 and 1981-1982 field seasons, and the geodetic measurements of ice motion and ablation at the Allan Hills site. Descriptions and classifications are given for all specimens collected during the 1980-1981 season and for most of those collected during the 1981-1982 season. Review articles are included on the petrology and classification of 145 small meteorites collected in the 1977-1978 season, on antarctic type 3 chondrites, and on cosmic-ray-produced nuclides in the Victoria Land meteorites. The first lunar meteorite is described. Chemical analyses of 25 Victoria Land meteorites are published, with a discussion of antarctic weathering effects. The appendix lists all of the Victoria Land meteorites classified as of June 1983, by numerical order for each locality and by meteorite class. (Auth.)

E-30998

Cassidy, W.A., **1980-1981 field season,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.507, 1 ref.

DLC QE1.S227

The 1980-1981 field season activities at Victoria Land emphasized investigation of new sites for possible meteorite concentrations, rather than the collection of same at known sites. These included the Reckling Moraine, where 67 specimens were found, the Outpost Nunatak, where only a single small specimen was located, and the Taylor Valley, which yielded none.

E-30999

Fudali, R.F., Schutt, J.W., **Field season in Victoria Land, 1981-1982,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.9-16, 3 refs.

DLC QE1.S227

The 1981-1982 field season activities included a resurvey of ice ablation rates at the Allan Hills triangulation network, the recovery of 387 meteorite specimens, and a gravity survey to model the ice-bedrock interface, also at Allan Hills, South Victoria Land. Reconnaissance meteorite searches, conducted in North Victoria Land, resulted in no new finds.

E-31000

Schultz, L., Annexstad, J.O., **Ablation and ice movement at the Allan Hills Main Icefield between 1978 and 1981,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.17-22, 14 refs.

DLC QE1.S227

The ablation rate of the ice at the Allan Hills meteorite icefield averages about 5 cm/year. The ice from the eastern antarctic ice sheet approaching the Allan Hills slows down and becomes stagnant. The ice velocity 13 km west of the Allan Hills is about 1m/year; at a distance of about 5 km from the Allan Hills it is almost zero. The experimental uncertainties are too high to determine vertical ice velocities. (Auth.)

E-31001

Score, R., Schwarz, C.M., Mason, B., **Description of stony meteorites,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.23-47, 3 refs.

DLC QE1.S227

Descriptions, arranged by class, of the individual specimens collected during the 1980-1981 and 1981-1982 field seasons are provided. Specimens weighing less than 100 grams are listed without descriptions, unless they show distinctive features.

E-31002

Clarke, R.S., Jr., **Descriptions of iron meteorites and mesosiderites,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.49-53, 4 refs.

DLC QE1.S227

This section provides brief descriptions of two octahedrites, a hexahedrite, an ataxite, and a mesosiderite collected during the 1980 and the 1981 field seasons. The descriptions are preliminary and based largely on material prepared for publication in the *Antarctic Meteorite Newsletter.* Also included is a well-studied mesosiderite, RKP A79015, from the 1979 season that was not included in the previous publication in this series. (Auth.)

E-31003

McKinley, S.G., Keil, K., **Petrology and classification of 145 small meteorites from 1977 Allan Hills collection,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.55-71, Refs. p.69-71.

DLC QE1.S227

Mineralogic and petrographic study of 145 previously undescribed, small meteorites weighing <150 g from the 1977 Allan Hills collection, indicates that 120 are equilibrated (petrologic types 4 to 6) H(102), L(16), and LL(2) group chondrites. The remaining 25 specimens include 19 that are paired with the graphite-magnetite-bearing L3 chondrite ALHA77011; three unpaired LC ordinary chondrites; two paired specimens of an enstatite chondrite (EH4); and one carbonaceous chondrite (C30). The discovery of new and rare meteorites that are generally no more severely weathered than large meteorites strongly argues for continued collection of small meteorites in Antarctica. (Auth.)

E-31004

Scott, E.R.D., **Classification, metamorphism, and brecciation of type 3 chondrite from Antarctica,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.73-94, Refs. p.90-94.

DLC QE1.S227

Twenty-one type 3 chondrites from the 1969-1980 collections are described, and chemical and petrologic studies relevant to their classification into groups and subtypes are reviewed. New electron-probe analyses of silicates in 11 type 3 and 4 ordinary chondrites, suggesting that several should be reclassified, are presented. Seven of these chondrites indicate that metamorphism must have preceded lithification of these rocks. It is concluded that most type 3 chondrites are breccias of materials with differing metamorphic histories

E-31005

Marvin, U.B., **Meteorite from the Moon,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.95-103, 16 refs.

DLC QE1.S227

Laboratory studies show that the specimen described is a meteorite from the Moon; the first one ever found on Earth. The fragmental fabric of the breccia is illustrated. A heterogeneous array of mineral and rock clasts and masses of devitrified glass are embedded in a dar brown, glassy matrix. The matrix, defined as material with a grain size less than 25 micron, occupies about 60%, and the clasts about 40% of the area. Some clasts show shock effects. A strong indication of lunar origin is provided by the ratios of manganese to iron oxides in the pyroxene minerals of the clasts.

E-31006
Nishiizumi, K., **Cosmic-ray-produced nuclides in Victoria Land meteorites,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.105-109, 29 refs.

DLC QE1.S227

A compilation of published and unpublished data for Victoria Land meteorites for which measurements of more than one nuclide are available is presented. The table also includes the exposure age and terrestrial age of these meteorites. The exposure age was calculated from the cosmogenic Ne-21 content; the shielding condition was corrected by the Ne-22/Ne-21 ratio or from cosmogenic K-40 content. The terrestrial age of the meteorite was calculated from Cl-36 or C-14 content, comparing it with the saturated activity level that was expected at the time of fall on Antarctica.

E-31007
Jarosewich, E., **Bulk chemical analyses of antarctic meteorites, with notes on weathering effects on FeO, Fe-metal, FeS, H2O, and C,** *Smithsonian Institution. Smithsonian contributions to the earth sciences,* 1984 No.26, p.111-114.

DLC QE1.S227

Bulk chemical analysis of some rare meteorites was undertaken as part of a broader study of Antarctic meteorites; particularly, the type 3 chondrites. Data for 17 newly analyzed chondrites and for 8 meteorites published earlier by Marvin and Mason (1980) are tabulated, giving primarily basic geochemical information and indicating the degree of weathering. This work establishes that the presence of H2O and low Fe-metal with resulting high FeO and depletion of FeS is accompanied by an increase of C, which is clearly a contaminant.

E-31012
Wellman, P., Williams, J.W., **Extent of Archaean and Late Proterozoic rocks under the ice cap of Princess Elizabeth Land, Antarctica, inferred from geophysics,** *Australia. Bureau of Mineral Resources, Geology and Geophysics. BMR journal,* Sept. 1982 7(3), p.213-218, 17 refs.

DLC QE340.A37a

A helicopter survey has mapped gravity and magnetic anomalies and ice thickness over a 100 km by 100 km ice cap area, inland from coastal outcrops of Archaean and Late Proterozoic rocks of the Princess Elizabeth Land coast. The gravity and magnetic anomalies indicate that there is no major change in crustal structure across the boundary between Archaean and Late Proterozoic rocks. The Archaean rocks of the Vestfold Hills do not extend further inland, but they may extend under Prydz Bay or as a narrow coastal strip under ice inland from the West Ice Shelf, 150 km to the northeast of the Vestfold Hills. Late Proterozoic rocks probably underlie most of the ice cap along the coast. (Auth.)

E-31013
Sheraton, J.W., England, R.N., Ellis, D.J., **Metasomatic zoning in sapphirine-bearing granulites from Antarctica,** *Australia. Bureau of Mineral Resources, Geology and Geophysics. BMR journal,* Dec. 1982 7(4), p.269-273, 13 refs.

DLC QE340.A37a

Highly magnesian (mg about 98) granulites, containing sapphirine, enstatite, spinel, phlogopite, and cordierite, occur as xenoliths in Precambrian orthopyroxene-bearing granitic rocks at Mawson and Gage Ridge, East Antarctica. At Mawson, a marginal reaction zone is considerably enriched in Fe, K, and volatiles H2O and F, largely at the expense of Mg, with the development of sapphirine + phlogopite-rich assemblages. At gage ridge, marginal gain of Fe and to some extent Ca and Na, and loss of Mg are indicated, but there was no significant gain of K or H2O, possibly because very low P(H2O) did not allow crystallisation of phlogopite. (Auth.)

E-31017
Austin, P.M., Williams, G.E., **Tectonic development of Late Precambrian to Mesozoic Australia through plate motions possibly influenced by the Earth's rotation,** *Geological Society of Australia. Journal,* Mar. 1978 25(1), p.1-21, Refs. p.17-21.

DLC QE340.G413

From the integration of geological and geophysical data it is inferred that Australia underwent episodes of eastward drift and clockwise rotation during the Paleozoic. These motions mirror those by Paleozoic North America: together with palaeontological clock data and evidence of broad synchronism in worldwide orogeny they suggest an influence of the Earth's rotation on global tectonism. The tectonic analysis of Australia is expanded and revised, incorporating aspects of tectonism in the formerly contiguous antarctic continent. A locality map, showing some important geological features, such as the approximate relation between the East Antarctic Shield and Australia throughout Paleozoic and Mesozoic, is included.

E-31018
Crook, K.A.W., Belbin, L., **Southwest Pacific area during the last 90 million years,** *Geological Society of Australia. Journal,* Mar. 1978 25(1), p.23-40, Refs. p.38-40.

DLC QE340.G413

Maps of the southwest Pacific area at 90, 60, 53, 38, 29, 21, and 10 m.y., accompanied by brief descriptions of the data and paleogeographic developments in each major area within the region are presented. Four stages in the regional paleogeographic development are mentioned. A comprehensive explanation of these stages is given using the zonal spreading model proposed by Crook (1977). The configuration of the Australia-Antarctica margin prior to the opening of the southern ocean, strongly constraining the geometric relationships between the northern and southern parts of the New Zealand Plateau prior to the formation of the Tasman Basin, is shown and discussed. (Auth. mod.)

E-31019
Webby, B.D., **History of the Ordovician continental platform shelf margin of Australia,** *Geological Society of Australia. Journal,* Mar. 1978 25(1), p.41-63, Refs. p.59-63.

DLC QE340.G413

An Early-Middle Ordovician reconstruction of the continental disposition of Australia, Antarctica and Greater India, showing the inferred position of the main mountain ranges in Australo-Antarctica, extent of the Larapintine Sea, and the suggested relationships to climatic zones and major ocean currents, is illustrated and discussed.

E-31020
Williamson, P., **Paleomagnetism of outcropping oceanic crust on Macquarie Island,** *Geological Society of Australia. Journal,* Dec. 1978 25(7), p.378-394, 13 refs.

DLC QE340.G413

Macquarie Island offers a rare opportunity to investigate outcropping ocean crust. In this study, paleomagnetic samples were collected from 32 sites. After frequency demagnetization, 15 of these sites were found to be stable. Stable sites were from lavas, dykes, and gabbros, representing different depths of formation in the oceanic crust. The final pole for Macquarie Island was found to be consistent with a pole of similar age from the Australian continent. This is consistent with Macquarie Island being formed as part of the Indian plate. The magnetic properties of the rocks are consistent with seafloor-spreading anomalies originating from the lavas, with a possible deeper contribution from the gabbros. The dolerite dykes which are paleomagnetically stable appear to have natural remanent magnetizations which are too low to contribute significantly to seafloor-spreading anomalies. (Auth. mod.)

E-31021
Kameneva, G.I., ed, **Catalog of chemical analyses of magmatic rocks from Antarctica** [Katalog khimicheskikh analizov magmaticheskikh porod Antarktidy], Leningrad, 1983, 184p., In Russian. 49 refs.
DLC QE461.K36

Results of 1254 chemical analyses of intrusive and volcanogenic rocks from different geological periods are given, covering the following areas: the Antarctic Peninsula, Marie Byrd Land and the Eights Coast, Victoria Land, the Transantarctic Mountains, Pensacola Mountains, Shackleton Mount, and Ellsworth Mountains. Several structural-formation schemes are included.

E-31027
Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol. 4, No. 2, Nov. 1981,** Houston, Texas, NASA Johnson Space Center, 1981, 26p. N82-22128.

Data sheets for a number of meteorites, including three achondrites and one iron, recovered in the 1980 field season and two 1978 stones, are presented. Classification, weight, location, and physical and photographic description of the specimens are included.

E-31028
Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol. 6, No. 1, Feb. 1983,** Houston, Texas, NASA Johnson Space Center, 1983, 34p. N83-20880.

A total of 113 meteorite recoveries are reported for the 1982-1983 field season from new areas of meteorite concentration. Classification, weight, location and physical description of individual samples are given.

E-31029
Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol. 6, No. 2, Aug. 1983,** Houston, Texas, NASA Johnson Space Center, 1983, 22p. N83-33820.

Meteorites from the 1981 and 1982 antarctic collection are listed showing classification, weight, degree of weathering, degree of fractioning, % Fa, and % Fs. Physical and petrographic characteristics are described for 23 samples from the Allan Hills, Thiel Mountains, the Pecora Escarpment and the Elephant Moraine locations.

E-31032
Ravich, M.G., ed, Grikurov, G.E., ed, **Geological map of Antarctica, scale 1:5,000,000** [Geologicheskaia karta Antarktidy masshtaba 1:5,000,000], Leningrad, Aerogeologiia, 1976, 4 sheets, In Russian and English.
DLC G9801.C5

This map provides information on intrusive and volcanic rock evolution in Antarctica since Lower Archean. Contours of sub-ice relief and thickness of ice cover in meters are also shown.

E-31033
Grikurov, G.E., ed, **Tectonic map of Antarctica, scale 1:10,000,000** [Tektonicheskaia karta Antarktidy masshtaba 1:10,000,000], Leningrad, Aerogeologiia, 1978, 1 sheet, In Russian and English.
DLC G9801.C55

This map provides information on the stratigraphic and tectonic evolution of Antarctica since Precambrian. Three plots showing a 1:20,000,000 bedrock relief of Antarctica, a 1:40,000,000 crust thickness map of Antarctica, and a 1:40,000,000 map of tectonic provinces of Antarctica, respectively, are also given.

E-31036
Matthews, D.W., **Geology of Pourquoi Pas Island, northern Marguerite Bay, Graham Land,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.1-20, 6 refs.

The results of geological reconnaissance mapping are presented. No metamorphic complex rocks are seen on Pourquoi Pas Island, the oldest rocks being granodiorites, which are apparently overlain by a varied succession of volcanic strata totaling more than 1500 m. The junction may be a pre-volcanic erosion surface. The full thickness of volcanic strata is referred to the Antarctic Peninsula Volcanic Group, and the possibility of older Palaeozoic volcanic activity there is refuted. Andean plutonic rocks form an intrusive complex in the western half of the island, with very varied lithologies and intrusive forms. Some molybdenite mineralization occurs in a granite. Post-Andean hypabyssal rocks are not common. A major, probably post-Andean, shear zone intersects the south-eastern corner of the island, with a substantial downthrow on its northern side. This is a major feature which can be traced some distance farther north and may be related to a fracture zone in the Bellingshausen Sea. (Auth.)

E-31037
Smellie, J.L., **Syn-plutonic origin and Tertiary age for the (?) Precambrian False Bay schists of Livingston Island, South Shetland Islands,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.21-32, 32 refs.

The False Bay schists are tabular enclave-like rocks, which occur within a 40 Ma tonalite pluton and a metagabbro pluton on the north-east side of False Bay, Livingston Island. The metagabbro was formerly regarded as an early dioritic phase of the tonalite but rhythmic layering is well developed at one locality and it is likely that two distinct plutons are present. The schists were previously interpreted as xenoliths of a (?) Precambrian metamorphic basement fragmented by the tonalite pluton during its emplacement. However, a mineralogical and textural gradation can be traced between the schists and a series of lamprophyric dykes, which intrude the plutonic rocks, and there are field relationships which suggest that the schists formed by injection as basic dykes. It is suggested that the mineralogy and textures of the schists are primary and that they evolved by injection and crystallization under conditions of stress during the emplacement of the tonalite pluton. Therefore, the schists are syn-plutonic and of Tertiary age. (Auth.)

E-31038
Storey, B.C., **Geology of Ducloz Head area, South Georgia,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.33-46, 16 refs.

A sequence of massive silicic, epiclastic and volcaniclastic sediments and basaltic pillow lavas together with thin-bedded andesitic and felsitic tuffs and mudstones are termed the Ducloz Head Formation. The volcaniclastic and epiclastic sediments were derived from an active dacitic and rhyolitic volcanic center and a granitic and low-grade metasedimentary terrain. The coastal member is intruded by massive spilitic rocks. The rocks have suffered extensive ductile and brittle deformation, and are metamorphosed to zeolite and prehnite-pumpellyite facies. It is proposed that the rhyolites and dacites may represent an early acidic stage of a rift zone that later formed a back-arc basin. The volcaniclastic and epiclastic sediments of the coastal member were derived from these rhyolites and dacites, and from the continental fragment that split off to form the basin; the sediments are the initial fill of this basin. The massive and pillowed spilitic rocks may have been derived from the same basic magma source as that which formed the floor of the basin. (Auth.)

E-31040

Care, B.W., **Petrology of the Rouen Mountains, northern Alexander Island,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.63-86, 34 refs.

A large batholith of probable Tertiary age, which exceeds 1000 sq km in area and comprises tonalite, granodiorite, adamellite, granite and quartz-feldspar-porphyry, intrudes (?) Permian-Triassic sediments of the Le May Formation. Thirty-one modal analyses are included in a field and petrographical description of this batholith; enclaves of both sedimentary and igneous origin are described and possible source material for the latter is discussed. Minor basic and intermediate dykes are the youngest rocks in the range. Geophysical evidence for a possible cogenetic relationship between the extrusive and intrusive rocks, which form a north-south belt through central Alexander Island, is discussed. In a regional setting, the igneous rocks of Alexander Island are comparable to those of the South Shetland Islands in occupying a position to the west of a Mesozoic batholith which underlies the west coast of the Antarctic Peninsula. (Auth.)

E-31041

Mair, B.F., **Larsen Harbour Formation and associated intrusive rocks of southern South Georgia,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.87-107, 18 refs.

The Larsen Harbour Formation is a tilted but undeformed sequence of pillow lavas, stratiform breccias, volcanogenic sediments and rhyolites; it is thought to represent a strip of Mesozoic oceanic crust formed during the development of a marginal basin within the continental margin of Gondwanaland. The formation has undergone greenschist metamorphism associated with the oceanic environment of emplacement. The spilitic affinity of these rocks in discussed but it is suggested that the lavas and associated basic rocks are better classified as metabasalts than as true spilites. A high-level "tonalite" body intrudes the lava sequence and is itself cross-cut by later swarms of basic dykes. Zones with abundant single and multiple dykes are thought to represent former spreading centers in the oceanic crust. A detailed account of the mineralogy of the lavas and intrusive rocks is given and an original map of the geology of the southern part of South Georgia is presented. (Auth.)

E-31042

Clarkson, P.D., **Geology of the Shackleton Range: II. The Turnpike Bluff group,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.109-124, 21 refs. See 12E-26108, 13E-27462, and 14E-31049 for Part IV, Part I, and Part III respectively.

The Turnpike Bluff Group comprises four formations exposed along the south side of the Shackleton Range. In the east, quartzites and metalimestones rest unconformably on the metamorphic basement and are overlain by tightly folded and cleaved siltstones with minor conglomerates. The group youngs westward and becomes increasingly argillaceous apart from a thick sequence of quartzites. An east-west fold trend, usually plunging gently westward, is consistent throughout the group forming large open folds in quartzite and tight, isoclinal and chevron folds in slates. The age of the group is unknown but it is presumed to be late Precambrian. Regional correlation with similar rocks in the Transantarctic Mountains is discussed. (Auth.)

E-31043

Matthews, D.W., **Geology of Horseshoe and Lagotellerie Islands, Marguerite Bay, Graham Land,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.125-154, 26 refs.

The results are presented of geological mapping of Horseshoe and Lagotellerie Islands at a scale of 1:25,000. A basal metamorphic complex is represented by both ortho- and paragneisses. Heterogeneous granites with occasionally a weak foliation are thought to belong to an early suite cut by a volcanic agglomerate. Varied arenaceous sediments may form a base to the main volcanic succession of tuffs, agglomerates and lavas, but volcanic rocks are very extensive. Intercalated shales on Lagotellerie Island contain Jurassic plant remains. Andean plutonic types are abundant, the southern half of Horseshoe Island being largely Andean granite. The north-western part shows an arcuate arrangement of successive gabbro and granite intrusions, some of which show signs of copper and iron mineralization. A major shear zone of uncertain age is thought to intersect the center of the island. (Auth.)

E-31045

Clayton, R.A.S., **Geology of north-western South Georgia: IV. Structural geology,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.187-204, 11 refs. See 9E-19028, 13E-27448, and 13E-27449 for parts I, II, and III respectively.

Structural mapping of the area bounded by the Bay of Isles, King Haakon Bay and Wilson Harbour has led to the recognition of three phases of folding. The first folds (F1) are asymmetrical with steep southerly dipping axial surfaces and gentle westerly plunging hinges. The first cleavage is intense in all lithologies, occurring as a slaty cleavage in the mudstones and a fracture cleavage in the volcanic greywackes. Minor F2 folds are slightly asymmetric open structures with a gentle westerly plunge. The hinge surfaces of the minor folds dip steeply to the north and, although large-scale F2 folds have not been observed in the field, their presence is inferred both from stereographic analysis and from systematic changes in the attitude of the first cleavage. F3 folds are characteristically monoclinal with north-north-easterly trending hinges and subvertical hinge surfaces. Although a corresponding crenulation cleavage has not been observed, the F3 folds generally occur in association with well-developed kink banding, which is axial planar to the major structures. The formation of the F1 folds and the superimposed F2 structures is attributed to a northerly directed compressive stress. (Auth.)

E-31049

Clarkson, P.D., Wyeth, R.B., **Geology of the Shackleton Range: III. The Blaiklock Glacier group,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.233-244, 19 refs. See 12E-26108, 13E-27462, and 14E-31042 for Part IV, Part I, and Part II respectively.

The Blaiklock Glacier Group of sandstones and conglomerates is the youngest major rock group in the Shackleton Range. The sediments appear to have been locally derived from the Precambrian basement complex on which they rest unconformably and they are considered to be of Cambro-Ordovician age by the evidence of fossiliferous erratics. The anticlinal structure of the group is related to the Ross orogeny and the rocks are correlated, where possible, with equivalent sedimentary strata in the Transantarctic Mountains and western Dronning Maud Land. (Auth.)

E-31070

Sipiera, P.P., **Antarctic search for meteorites,** *Explorers journal,* Dec. 1984 62(4), p.168-173.

A brief account is given of a six-weeks field trip in the Allan Hills searching for meteorites. The pre-expedition activities and preparations are mentioned; the aerial transport to and the unloading at the camp site are described. Tent life during days of bad weather, the daily radio contacts with McMurdo, Christmas and New Year's celebrations are discussed. Methods and success of the search are given. Activities of the field party were recorded by a BBC film crew producing a segment on techniques of meteorite field searching.

E-31074

Singer, J.K., Anderson, J.B., **Use of total grain-size distributions to define bed erosion and transport for poorly sorted sediment undergoing simulated bioturbation,** *Marine geology,* May 1984 57(1/4), p.335-359, 25 refs.

Flume experiments were conducted using poorly sorted beds made to resemble those glacial deposits that blanket the Antarctic seafloor today. Flow within the flume was gradually increased over 2 cm/s increments up to 20 cm/s. An initial run was made without altering the bed, and two additional runs were made in which the bed was mechanically mixed in order to simulate bioturbation. Initial and efficient transport of a given size particle was determined using total grain-size distribution data for samples taken from the residual bed, from trays placed at different elevations above the floor of the flume, and from the water column. Using this method, we were able to measure the current velocities at which initial movement occurred, as well as relate different modes of transport for given size ranges to current velocity. Results of the measurements are shown in graphs. (Auth. mod.)

E-31077

Anckorn, J.F., **Geology of parts of the Wilkins and Black Coasts, Palmer Land,** *British Antarctic Survey. Scientific reports,* 1984 No.104, 30p., 33 refs.

After a summary of the general stratigraphy of northeastern Palmer Land, the field relations and petrography, history, structure and geochemistry of the metamorphic complex, the Paleozoic intrusive rocks, the Upper Jurassic volcanic group, the Andean intrusive suite and the Post-Andean hypabyssal rocks are discussed, as are the Tertiary block faulting and related earth movements. A geological sketch map of parts of the Wilkins and Black Coasts is included. Modal analyses of selected Andean intrusive rocks, and chemical analyses of Pre-Andean and Andean plutonic rocks are tabulated.

E-31078

Davies, T.G., **Geology of part of northern Palmer Land,** *British Antarctic Survey. Scientific reports,* 1984 No.103, 46p., Refs. p.45-46.

Field relations, geochemistry, petrography, age and alteration are some of the subjects discussed in this study covering the metamorphic complex, the metavolcanic and metasedimentary rocks, the pre-volcanic plutonic rocks, the Upper Jurassic volcanic group, the Mount Charity sedimentary and volcanic rocks, the Andean intrusive suite, the alkali-granite, and the hypabyssal rocks from northern Palmer Land. A geological sketch map is included. Chemical analyses of rocks from the metamorphic complex to the east of the Eternity Range, of lavas from the Upper Jurassic volcanic group, and of plutonic and hypabyssal rocks are tabulated.

E-31087

Green, W.J., Canfield, D.E., **Geochemistry of the Onyx River (Wright Valley, Antarctica) and its role in the chemical evolution of Lake Vanda,** *Geochimica et cosmochimica acta,* Dec. 1984 48(12), p.2457-2467, 28 refs.

The Onyx River is a dilute meltwater stream originating in the vicinity of the Wright Lower Glacier. It acquires a significant fraction of its salt content when glacial meltwaters contact Wright Valley soils at Lake Brownworth and the concentrations of all ions increase with distance along the 28-km channel down to Lake Vanda. Average millimolar concentrations and annual fluxes of major ions at the Vanda weir during the 1980-81 flow season are listed. It is proposed that the Vanda brine is the result of past (>1200 yrs BP) mixing events between rich deep groundwaters derived from Don Juan Basin. All concentrations except Mg are well predicted by the model. The chemical composition of the geologically recent upper lake is explained in terms of ionic diffusion from the pre-formed brine, coupled with Onyx River inflow. Ionic ratios calculated from this latter model are in very good agreement with those observed in the lake at 35 meters. (Auth. mod.)

E-31089

Kyle, P.R., Seward, D., **Dispersed rhyolitic tephra from New Zealand in deep-sea sediments of the southern ocean,** *Geology,* Aug. 1984 12(8), p.487-490, 30 refs.

Dispersed rhyolitic tephra in deep-sea piston cores collected from the South Pacific sector of the southern ocean have previously been considered to originate from the Balleny Islands. Chemical composition of the materials suggests that a source in New Zealand is more likely. A strong correlation exists between paleomagnetically determined ages for these deep-sea tephra layers and fission-track ages determined on volcanic glasses and zircons from tephra sequences in Wanganui Basin and Cape Kidnappers, New Zealand. The correlation suggests that the tephra extend more than 5000 km east and south of New Zealand. (Auth.)

E-31092

Sheraton, J.W., **Chemical changes associated with high-grade metamorphism of mafic rocks in the East Antarctic Shield,** *Chemical geology,* Nov. 30, 1984 47(1/2), p.135-157, Refs. p.154-157.

High-grade metamorphism of mafic rocks commonly results in significant depletion in large-ion lithophile (LIL) elements: Rb and, to lesser extents, Th, Ba and K, and probably U and Pb. Deformation is probably an important factor by favoring access of a fluid phase capable of removing these elements during prograde metamorphism and dehydration; static recrystallization under similar P-T conditions has little or no effect on chemical composition. More extensive chemical changes are related to major changes in mineralogy. Thus, high-pressure metamorphism, involving development of garnet at the expense of plagioclase and orthopyroxene, results in greater depletion in Rb, Ba, K and Pb, as well as Na and Sr, and possibly Cu. Other incompatible elements such as Nb, La, Ce, P, Zr, Ti and Y are not significantly affected by high-grade metamorphism and are therefore potentially useful in the characterization of magma types. (Auth.)

E-31115

Farquharson, G.W., **Late Mesozoic, non-marine conglomeratic sequences of northern Antarctic Peninsula (the Botany Bay Group),** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.1-32, Refs. p.30-32.

Non-marine conglomerates exposed at Hope Bay (Mount Flora Formation), View Point, Camp Hill, Downham Peak and Tower Peak in northern Antarctic Peninsula are described and discussed. Indirect evidence suggests an early Cretaceaous age for their deposition. The conglomerates lie on metasedimentary rocks. The dominant lithology is clast-supported conglomerate, the product of debris flow and braided stream deposition on alluvial fans; accompanying sandstones are either sheetflood or braided stream deposits. In addition to being the thickest development of such strata (780 m), the succession at Camp Hill is unusual in containing a thick floodplain sequence with fluvial, overbank and lacustrine deposits. (Auth. mod.)

E-31116

Marsh, P.D., Thomson, J.W., **Location and geology of nunataks in north-western Coats Land,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.33-39, 24 refs.

The Littlewood Volcanics are part of a varied and widespread episode of magmatic and tectonic activity at c. 1000 Ma, the palaeogeography of which is now becoming better defined. During the late Precambrian and early Palaeozoic the area appears to have lain to the north of east-west trending zones of deformation within the continent, represented by Kirwanveggen and the Shackleton Range, and was to the east of the extrapolated trend of mobile belts along the continental margin, represented by the Pensacola Mountains. It may be part of the "stable platform" of western Dronning Maud Land which Wolmarans and Kent (1982) suggested was continuous with similar areas in southern Africa before the breakup of Gondwana.

E-31117

Moyes, A.B., Hamer, R.D., **Geology of the Arrowsmith Peninsula and Blaiklock Island, Graham Land, Antarctica,** *British Antarctic Survey. Bulletin,* Nov. 1984 No.65, p.41-55, 35 refs.

The Arrowsmith Peninsula and Blaiklock Island consist of a sequence of rocks belonging to the Antarctic Peninsula Volcanic Group intruded by plutons of the Andean Intrusive Suite. The volcanic rocks are principally basic lava flows and coarse-grained volcaniclastic sediments with minor fine-grained, bedded units. The plutonic suite ranges from gabbronorite to syenogranite, although monzogranite and granodiorite are most abundant. Both the volcanic and plutonic rocks are intruded by a complex series of dykes. The Arrowsmith Peninsula and Blaiklock Island are typical of the high-level rocks of the arc terrain found extensively on the western margin of the Antarctic Peninsula. (Auth.)

E-31128

Nunn, P.D., **Review of evidence for Late Tertiary shorelines occurring on South Atlantic coasts,** *Earth-science reviews,* 1984 20(3), p.185-210, Refs. p.205-210.

Possible late Tertiary shorelines from South Atlantic islands are described, as are those which have been positively dated to this period. Sedimentary and morphological indicators of tertiary high sea-levels are described from antarctic coasts and South American and African Atlantic continental margins. A summary of the evidence for Tertiary shorelines on South Atlantic coasts is tabulated. Methods which have been or could be used to date late Tertiary shorelines are described. It is suggested that fluctuations in the Antarctic ice sheet during the late Tertiary induced substantial glacio-eustatic changes of sea-level which may have been most marked in adjacent areas. This is considered to be the mechanism through which late Tertiary shorelines in the area were formed yet, considering the paucity of the morphological and sedimentary data these should not be used as the basis for a eustatic chronology. (Auth. mod.)

E-31129

Clark, R.D., **USGS Deep Sweep: new data from the Pacific,** *Geophysics: leading edge of exploration,* Oct. 1984 3(10), p.20-24.

Operation Deep Sweep, conducted by the U.S. Geological Survey on board R/V *Samuel Phillips Lee* and including a six-month cruise off Wilkes Land to explore antarctic mineral resource possibilities, is described. Its organization and funding, as well as the hardships incurred by the ship and its crew during the collection of data, are reviewed.

E-31130

Adams, C.J., **Age of volcanoes and granite basement of the Auckland Islands, Southwest Pacific,** *New Zealand journal of geology and geophysics,* 1983 26(3), p.227-237, Refs. p.236-237.

The ages of the Auckland Islands volcanoes conform to a pattern of late Cenozoic alkali basaltic volcanism in southern New Zealand and the Campbell Plateau. These volcanic centers decrease in age eastward from the Auckland Islands in the west, to the Antipodes Islands in the east. The potassium-argon age determinations of the Auckland Islands volcanic rocks and granites are tabulated.

E-31132

Martin, H., **Late Paleozoic Gondwana glaciation,** *Geologische Rundschau,* May 1981 70(2), p.480-496, In English with German, French and Russian summaries. Refs. p.494-496.

DLC QE1.G4917

The glacial deposits of Gondwana are spread over one whole hemisphere. On the reassembled Gondwana continents they still occupy an area exceeding that of the Pleistocene glaciation. During Stephanian-Sakmarian time, when the pole wandered over Antarctica, large ice sheets reached sea level in all the major depositories. Palaeotopographical reconstructions allow the conclusion that some of the ice centers were supported by uplands which reached altitudes of up to 1,500 m above sea level. Depending on their palaeotopographical positions the glacigenic sediments exhibit the full facies range to be expected between glaciated uplands and glaciomarine environments. There are indications that ice may have flowed from Africa into the Paraná Basin, and from Antarctica into the Great Karoo Basin and into Australia. There is some evidence that the final deglaciation proceeded in stages from South America over Africa to Antarctica. (Auth.)

E-31133

Miller, H., **Paleozoic and Early Mesozoic orogenes on the Pacific margin of Gondwana** [Paläozoische und frühmesozoische Orogenesen am pazifischen Rand Gondwanas], *Geologische Rundschau,* May 1981 70(2), p.519-529, In German, with English, Spanish and Russian summaries. Refs. p.526-528.

DLC QE1.G4917

A shifting of the orogenic activity in South America, Antarctica and Australia, toward the Pacific, from the Cambrian to the Triassic is observed. From the relative position of these orogenes it is concluded that before the Jurassic the Antarctic Peninsula was situated west of the southern tip of South America. (Auth.)

E-31149

Dalziel, I.W.D., **Frozen pieces of the Gondwana geological jig-saw puzzle,** *Columbia University. Lamont-Doherty Geological Observatory. Yearbook,* 1981 Vol.7, p.30-34.

DLC QE47.N5C4a

A general account of studies of remaining problems of Gondwanaland geology in Antarctica is given. The study of the relationship between East and West Antarctica, with the geological enigma of the Ellsworth Mountains, is discussed in greater detail.

E-31150

Lindenberg, H.G., Auras, A., **Distribution of arenaceous foraminifera in depth profiles of the southern ocean (Kerguelen Plateau area),** *Palaeogeography, palaeoclimatology, palaeoecology,* Nov. 1984 48(1), p.61-106, Refs. p.104-106.

Recent to subrecent benthonic arenaceous foraminifera from two areas of the southern ocean have been investigated with regard to their depth distribution and agglutination patterns. Strong differences exist between the arenaceous faunas from diatomaceous sediments west of the Kerguelen Plateau and glacial marine sediments from the slope of the antarctic continent. Major ecologic influences are seen in the effect of sedimentological factors (especially the clay content of the sediment), in the saturation level of calcium carbonate and in the nutrient condition of the biotope. Since these factors are a function of geographic position and related water masses, the main differences of deepsea faunas are primarily induced by the overall situation of an oceanic area rather than by depth or oceanographic factors like temperature or salinity. Availability of colloidal iron compounds also seems to be a limiting factor for distinct arenaceous species. (Auth.)

E-31151

McCulloch, M.T., Black, L.P., **Sm-Nd isotopic systematics of Enderby Land granulites and evidence for the redistribution of Sm and Nd during metamorphism,** *Earth and planetary science letters,* Nov. 1984 71(1), p.46-58, Refs. p.56-58.

Measurements of Nd-143/Nd-144 and Sm-147/Nd-144 are reported for whole rocks and mineral separates from granulites of the Napier Complex at Fyfe Hills. Chanockites, leuconorites and gabbros yield a whole rock Sm-Nd isochron age of about 3060 m.y. Due to the resetting of the Sm-Nd system on both whole rock and mineral scales, the primary crystallization age of the igneous protolith is not well constrained by the present data, although it is clearly >3100 m.y. An inferred reduction in the Sm/Nd ratio may have been the result of preferential loss of Sm relative to Nd during granulite facies metamorphism. (Auth. mod.)

E-31163

Miller, H., Lippmann, E., Kallerhoff, W., **Marine geophysical work during Antarctic II/4,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.116-128.

Seismic reflection profiling and marine magnetic profiling were carried out in the southern and southwestern Weddell Sea. In addition two seismic refraction lines for studies of crustal structure were observed with recording stations on land or on Filchner Ice Shelf. (Auth.)

E-31164

Haase, G., **Marine geology, SEA BEAM and 3.6 kHz measurements during the German Antarktis II/4 Expedition,** *[illegible]nerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.129-136.

While crossing the Weddell Sea en route to GvN Station, bottom profiling systems were operated continuously, producing reliable results over a profile length of 1408 nm. Penetration depths ranged from 90 m north of 66S to 0-15 m south of 66S. Marine geology was investigated in three areas: Weddell Polynya; one station off Kapp Norvegia; and two stations south of the west Indian Ridge. Stations were sampled with a box corer and a gravity corer; results are shown in tables. Four types of surface sediment were distinguished.

E-31170

Spaeth, G., Peters, M., **Geological investigations in the northern Ahlmann Ridge, middle New Schwabenland, Antarctica** [Geologische Untersuchungen im nördlichen Ahlmann-Rücken, mittleres Neuschwabenland/Antarktika], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.174-185, In German. 1 ref.

The report deals with the cooperation in the 1983/84 research season in an earth sciences program conducted jointly by the FRG and South Africa. Discussed are the preparation and beginning phase, logistics, geology of the work area, and preliminary results. Charts, maps and photographs are included.

E-31188

Feldmann, R.M., **Seymour Island yields a rich fossil harvest,** *Geotimes,* May 1984 29(5), p.16-18.

Seymour Island is described as an area geologically unique, for it consists of an abundantly fossiliferous sequence of clastic nearshore marine rocks. The quantity, quality and variety of fossils allow paleoecological, biostratigraphic and biogeographic interpretations on a very detailed scale.

E-31217

Birkenmajer, K., **Pliocene tillite-bearing succession of King George Island (South Shetland Islands, Antarctica),** *Studia geologica polonica,* 1982 Vol.74, p.7-72, With Polish summary. Refs. p.69-72.

A Pliocene tillite-bearing sedimentary-and-volcanic succession of King George Island, the Kraków Icefield Supergroup, some 600 m thick is subdivided into a lower Chopin Ridge Group and and upper Legru Bay Group, and those into a number of formations and members. The paper presents formal lithostratigraphical descriptions and illustrates type and reference sections of the Supergroup, as well as of intrusions of the succeeding Cape Syrezol Group (Pleistocene). Evidences of two Pliocene glaciations, the Polonez Glaciation (older) and the Legru Glaciation (younger), and of an interglacial period (Wesele Interglacial) between them, are discussed. (Auth.)

E-31218

Morycowa, E., Rubinowski, Z., Tokarski, A.K., **Archaeocyathids from a moraine at Three Sisters Point, King George Island (South Shetland Islands, Antarctica),** *Studia geologica polonica,* 1982 Vol.74, p.73-80, With Polish summary. 15 refs.

Lower Cambrian archaeocyathids occur in a limestone erratic of a Recent moraine consisting mainly of glaciomarine conglomerate of Pliocene age, at Three Sisters Point, King George Island. The erratic was most probably ice-transported from inner regions of the Weddell Sea during the late Tertiary Polonez Glaciation. (Auth.)

E-31219

Paulo, A., Tokarski, A.K., **Geology of the Turret Point-Three sisters Point area, King George Island (South Shetland Islands, Antarctica),** *Studia geologica polonica,* 1982 Vol.74, p.81-103, With Polish summary. 16 refs.

The Turret Point-Three Sisters Point area, King George Island was geologically mapped in 1980. A stratiform pile of andesitic and basaltic lavas with a few sediment intercalations (Mazurek Point Formation, probably Pliocene) forms a substantial part of the area. The pile is pierced by a laccolith-breccia body on Turret Point, and covered by tillites of the Pliocene Polonez Glaciation on Three Sisters Point. Small intrusions are the youngest volcanic rocks in the area. Physiography, outline of structural history, and mineralization of the area, are also presented. (Auth.)

E-31220

Birkenmajer, K., **Mesozoic stratiform volcanic-sedimentary succession and Andean intrusions at Admiralty Bay, King George Island (South Shetland Islands, Antarctica),** *Studia geologica polonica,* 1982 Vol.74, p.105-154, With Polish summary. Refs. p.152-153.

The stratiform complex of calc-alkaline andesitic-rhyolitic lavas and volcanoclastics usually referred to as the Upper Jurassic volcanics, is subdivided in the Admiralty Bay area, King George Island, into the Martel Inlet Group (1160 m +), and the Cardozo Cove Group (500 m +), and these into a number of formations and members. The Andean intrusions, here described as the Wegger Peak Group, post-date the Martel Inlet and Cardozo Cove groups, but pre-date the Tertiary (?Eocene-Middle Miocene) King George Island Supergroup. (Auth.)

E-31221

Birkenmajer, K., **Penguin Island volcano, South Shetland Islands (Antarctica): its structure and succession,** *Studia geologica polonica,* 1982 Vol.74, p.154-173, With Polish summary. Refs. p.172-173.

The Penguin Island volcano is a Recent stratocone situated on a basaltic platform of probably late Pleistocene age, at the northern margin of the Bransfield Rift which separates the South Shetland from the Antarctic Peninsula crustal blocks. Lithostratigraphic units of the volcano are described and the succession of volcanic events is discussed. (Auth.)

E-31222

Birkenmajer, K., **Report on geological investigations of King George Island and Nelson Island (South Shetland Islands, West Antarctica) in 1980-1981,** *Studia geologica polonica,* 1982 Vol.74, p.175-197, With Polish summary. Refs. p.195-197.

The principal activities of the Polish Antarctic Expedition in 1980-1981 here reviewed were: the geological mapping of King George and Nelson Islands; studies of Mesozoic volcanics and Tertiary stratiform volcanic complexes and intrusions at different points of the islands, the Melville Peak volcano, glaciomarine fossiliferous sediments, the Kraków Icefield Supergroup, Late Cenozoic phases of deformation, fossil fauna and paleoecology, and some paleomagnetic sampling.

E-31225

Amos, A.J., **Argentine guide of paleontology. Part 1: Paleozoic. Section 5: Carbonic fauna. Section 6: Permian fauna** [Guía paleontológica argentina. Parte 1: Paleozoico. Sección 5: faunas Carbónicas. Sección 6: faunas Pérmicas], Buenos Aires, Consejo Nacional de investigaciones Científicas y Técnicas, 1979, 158p., Refs. p.41-46.

DLC QE752.A7G84

Upper and Lower Permian fauna is listed, described, illustrated and grouped according to area of discovery. A bibliography and index of genera and species are included. Two species, Paleodictyoptera and *Permagrion falklandicus* are listed for Falkland Islands.

E-31226

Glasby, G.P., Hunt, J.L., Rankin, P.C., Darwin, J.H., **Major element analyses of marine sediments from the Southwest Pacific,** *New Zealand Soil Bureau. Scientific report,* 1979 No.36, 127p., Refs. p.72-87.

A total of 348 sediment samples from the S.W. Pacific region, including 102 samples from the Ross Sea, have been analysed by X-ray fluorescence spectrometry for nine major elements and gravimetrically for % loss on ignition. A series of maps showing element distribution throughout the region has been prepared and the data have been subjected to statistical analysis. A number of conclusions drawn from this work are as follows: Well-developed geographic variations in element concentrations of sediments, in both the S.W. Pacific and Ross Sea regions are observed, as is a similarity in composition of sediments from the Ross Sea proper and a sediment sample from the Ross Ice Shelf Drilling Project; the S.W. Pacific and D.S.D.P. sediments were effectively grouped by cluster analysis but the Ross Sea sediments, which are more homogeneous continental shelf sediments with low CaCO3 contents could not be meaningfully grouped by Q-mode cluster analysis; the data cast doubt on previous assertions of the occurrence of metalliferous sediments of hydrothermal origin in mid-plate regions; the role of low sedimentation rates in facilitating enrichment of iron and manganese in deep-sea sediments is emphasised. (Auth. mod.)

E-31227

Deep sea drilling: touching the last frontier, *Florida State University, Tallahassee. Bulletin,* Dec. 1982 75(8), p.3, 13.

The history of the Deep Sea Drilling Project is briefly reviewed, and the benefits derived from it in adding to scientific knowledge, from tectonic plate movement to micropaleontology, are discussed.

E-31228

Cassidy, D.S., **Photography plays major role in antarctic marine research program,** *Newsletter for graphic arts and photography instructors,* Oct. 1976 10(1), p.1-6.

The background of the Antarctic Marine Geology Research Facility at Florida State University's Department of Geology is described, as are the role of photography in the program, its unusual applications and the various instruments used for the different photographic techniques.

E-31232

Valle, R.A. del, Fourcade, N.H., **Geological observations on Cape Fairweather, Antarctica** [Observaciones geologicas en cabo Buen Tiempo, Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.299, 14p., In Spanish, with English, French and German summaries. 24 refs.

Sedimentites of Late Jurassic age originated in the distal part of a submarine fan through turbiditic processes crop out at Cape Fairweather, situated on the eastern edge of the Antarctic Peninsula. These rocks belong to the Ameghino Formation which could be correlated with the Latady Formation of the Lassiter coast and the Black coast in the southern part of the peninsula. At Cape Fairweather neither the roof nor the base of the succession crops out; its partial thickness is 400 m approximately and the sedimentites are folded and metamorphosed in a low degree by the intrusion of a tonalitic pluton belonging to the Andean Complex. The axes of the folding have a N-NE strike with a wave length of 4 km approximately and an amplitude of 100 m. The sedimentary sequence consists of thin and very well stratified banks of mudstones, claystones and dark brown and very fine sandstones. The only fossils found at Cape Fairweather are molds of *Inoceramus haasti* Hochtetter and *Inoceramus aff. subhaasti* Wandel. The sequence is intruded also by subconcordant dikes and by others of later age, which cut the stratification in a clear way. The mechanism of deposition of the sedimentary rocks permits to establish that the Jurassic mountains of the Antarctic Peninsula underwent a sudden erosion and that, at that time, they behaved as unstable tectonic zones, recording also the existence of a marine, deep and elongated basin which developed along the eastern foot of those Mesozoic mountain chains. (Auth.)

E-31235

Valle, R.A. del, Díaz, M.T., Romero, E.J., **Preliminary report on the sedimentites of Barton Peninsula, 25 de Mayo Island (King George Island), South Shetland Islands, Argentine Antarctica,** *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1984 No.308, 18 + 19p., In Spanish and English, with French and German summaries. 17 refs.

Continental deposits intercalated inside lavas were found in Barton Peninsula, southwest of King George Island. These deposits originated in fluvial environments with possible eolian stages, being carriers of a fossil flora attributed to the Early Eocene with possible extension up to the Early Oligocene. (Auth.)

E-31237

Weber, W., Hofmann, J., **On tectonics and mineralization in Antarctica** [Zur Tektonik und Minerogenie Antarktikas], *Zeitschrift für geologische Wissenschaften,* 1984 12(5), p.585-601, In German with English and Russian summaries. 37 refs.

Beginning with a review of the tectonic subdivision of Antarctica, mineral comparisons are made with other southern continents. These investigations give indications of antarctic regions especially suited for further study of mineral and metal formation. (Auth. mod.)

E-31288

Carpenter, R., Wakeham, S., **Mössbauer studies of marine and fresh water manganese nodules,** *Chemical geology,* Apr. 1973 11(2), p.109-116, 19 refs.

DLC QE515.C43

Practically identical Mössbauer spectra have been obtained for 40 ferromanganese nodules from a wide variety of marine and freshwater locations. None of the nodules examined contains more than one-weight percent Fe2 cation, so no more than a few percent of the total iron in these nodules can be Fe2 cation. Most of the iron is present as Fe3 cation in paramagnetic or superparamagnetic oxide phases, although hysteresis loops show the presence of small amounts of ferromagnetic phases not detected by the Mössbauer technique. (Auth.)

E-31289

Boström, K., Kraemer, T., Gartner, S., **Provenance and accumulation rates of opaline silica, Al, Ti, Fe, Mn, Cu, Ni and Co in Pacific pelagic sediments,** *Chemical geology,* Apr. 1973 11(2), p.123-148, Refs. p.146-148.

DLC QE515.C43

Accumulation rates and chemical compositions have been obtained for pelagic sediments for 73 locations in the Pacific and for 11 in the Indian Ocean. The data for the Pacific show that many elements accumulate rapidly close to the continents and slowly in the central part of the ocean. Cu and Ni show stronger tendencies than Fe and Mn to precipitate with opaline silica. The highest accumulation rates of Fe and Mn in the open Pacific occur along the East Pacific Rise, to some extent also Cu and Ni are enriched there due to volcanic processes. Al and Ti show high accumulation rates only close to the continents; these elements appear to be almost completely terrigenous. Sediments in the north as well as in the southernmost part of the Pacific are nearly entirely terrigenous. A balance estimate of the minerogen fraction of the deep-sea sediments from the open marine weathering (and release of basaltic debris in general) and submarine exhalations each account for only a small fraction of the sediments. (Auth. mod.)

E-31290

Le Maitre, R.W., **Experiences with CLAIR: a computerised library of analysed igneous rocks,** *Chemical geology,* Dec. 1973 12(4), p.301-308, 8 refs.

DLC QE515.C43

The CLAIR data file currently in use at the University of Melbourne contains 21,705 chemical analyses of igneous rocks of all types and ages from all over the world. The way in which these analyses have been collected and processed is described, together with the philosophy behind the file. Some statistics from the file indicate that only 7% of the analyses contain some minor-element determinations with major-element analysis; 12.7% of analyses are published with incorrect totals; and 2.9% of the rock names on the file account for 59.7% of all analyses. Comments are also made on the completeness of the analyses, their geographical distribution and the references from which they came. 146 (0.7%) of the analyses are from Antarctica. (Auth. mod.)

E-31291

Smellie, J.L., Pankhurst, R.J., Thomson, M.R.A., Davies, R.E.S., **Geology of the South Shetland Islands: 6. Stratigraphy, geochemistry and evolution,** *British Antarctic Survey. Scientific reports,* 1984 No.87, 85p., Refs. p.80-84.

A broad stratigraphic investigation of the South Shetland Islands is described, taking into account over 70 new radiometric age determinations (in addition to those already in the literature), over 300 chemical analyses, and a petrological study of rocks from the whole island group. Numerous maps, charts and tables, and an appendix describing the two analytical methods used, K-Ar dating and Rb-Sr dating, are included.

E-31294

Imbrie, J., **Orbital theory of Pleistocene climate: support from a revised chronology of the marine delta 18-O record,** NATO ASI Series C: Mathematical and Physical Sciences Vol.126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.269-305, Refs. and notes p.303-305.

DLC QC884.N185

Observations of delta 18-0 in five deep-sea cores provide a basis for developing a geological time scale for the past 780,000 years and for evaluating the orbital theory of Pleistocene ice ages. The isotopic measurements are obtained from shallow-dwelling planktonic foraminifera at widely distributed, open-ocean sites. The amplitudes of oscillations in this homogeneous set of isotopic records are highly correlated and must be strongly influenced by changes in the global volume of glacial ice. Three of the cores studied penetrate the Brunhes-Matuyama magnetic reversal, an event previously dated by K-Ar measurements at 730 KY BP. This date, and the assumption that variations in orbital precession and obliquity cause changes in global climate, are used to develop a new time scale for the delta 18-O record. Statistical evidence of a close relationship between the time-varying amplitude of orbital forcing and the time-varying amplitudes of the isotopic response implies that orbital variations are the main external cause of the succession of late Pleistocene ice ages.

E-31304

Ayling, M.E., **Geology of parts of Central and West Palmer Land,** *British Antarctic Survey. Scientific reports,* 1984 No.105, 60p., 25 refs.

This report embodies the results of an investigation of the volcanic, plutonic and hypabyssal rocks in two geologically related areas of Palmer Land which are about 40 km apart. In the first of these, the Taurus Nunataks-Braddock Nunataks area, volcanic rocks of probable Upper Jurassic age form the relic of a composite cone. Andean granodiorite, which has subsequently invaded these volcanic rocks, contains elongated basic inclusions and distinct linear flow structures which trend slightly west of north. In the second area, the Batterbee Mountains, acid extrusive rocks crop out around Swine Hill. The lowest sub-aqueous pillow lavas are succeeded by an apparently terrestrial succession of rhyolite flow lavas with interbedded tuffs and volcanic breccias, which are most abundant in the upper horizons. The volcanic rocks in the western Batterbee Mountains are intruded by granite, which is considered to be genetically related to gabbro and granodiorite intrusions farther east. (Auth. mod.)

E-31305

Casey, R.E., ***Lamprocyrtis* and *Stichocorys* lineages: biogeographical and ecological perspectives relating to the tempo and mode of polycystine radiolarian evolution,** North American Paleontological Convention, 3rd, Montreal, Aug. 1982, Proceedings. Vol.1. Compiled and edited by B. Mamet and M.J. Copeland, 1982, p.77-82, 25 refs.

DLC QE701.N67

To correctly interpret the tempo and mode of radiolarian speciation and macroevolution, the geography and ecological niches of extant, and paleogeography and paleoecological niches of extinct species (and higher taxa) of the studied lineages should be carefully considered. The *Lamprocyrtis* and *Stichocorys* lineages suggest that: "speciation by branching" (allopatric) with the ancestor coexisting time-wise for a significant time occurs when the new species occupies an environment different than its ancestor; "speciation by replacement" (maybe sympatric) with the ancestor-descendant overlap brief occurs when the new species remains in the ancestral species geographical environment; without detailed studies these long overlaps may suggest gradualism and the brief overlaps punctuation, however, both appear to occur almost instantaneously, except perhaps for the cases of allopatry; however, it appears to require some time for an allopatrically-evolved species to inhabit its maximum geographical range but very little time for a supposed sympatrically-evolved species to inhabit its maximum geographical range. (Auth.)

E-31307

Swain, F.M., **Early Paleozoic ostracoda of the Atlantic margin, other than eastern Canada,** Stratigraphic micropaleontology of Atlantic basin and borderlands. Edited by F.M. Swain, Developments in paleontology and stratigraphy, No.6, Amsterdam, Elsevier, 1977, p.19-48, With French summary. Refs. p.40-46.

DLC QE719.S83

Cambrian Archaeocopida and Ordovician and Silurian ostracodes are better developed in the marginal areas of the North Atlantic than those of the South Atlantic where rocks of those ages are only sparsely represented. The most useful assemblages biostratigraphically are those of the middle Ordovician and middle Silurian of both the eastern and western North Atlantic. (Auth.)

E-31308

Casey, R.E., McMillen, K.J., **Cenozoic radiolarians of the Atlantic basin and margins,** Stratigraphic micropaleontology of Atlantic basin and borderlands. Edited by F.M. Swain, Developments in paleontology and stratigraphy, No.6, Amsterdam, Elsevier, 1977, p.521-544, With French summary. Refs. p.534-536.

DLC QE719.S83

Living radiolarians in the Atlantic are indicative of specific water masses. Radiolarian skeletons occur only in the upper few centimeters of late Neogene sediments over most of the mid and lower latitudes of the Atlantic. This is in contrast to common occurrences of radiolarians in the sediments of these latitudes during much of the Paleogene and early Neogene. Paleogene to early Neogene radiolarian biostratigraphies are cosmopolitan due to the pan-tropical oceanic connection. Isolation of the Atlantic starting in Mid-Miocene resulted in changes in siliceous sedimentation and the development of provincial radiolarian faunas. The development of a new cosmopolitan radiolarian zonation based on tropical submergent forms may aid in interoceanic warm water correlations. (Auth.)

E-31309

Casey, R.E., **Atlantic Cenozoic silicoflagellates, potential for biostratigraphic and paleoecologic studies,** Stratigraphic micropaleontology of Atlantic basin and borderlands. Edited by F.M. Swain, Developments in paleontology and stratigraphy, No.6, Amsterdam, Elsevier, 1977, p.545-552, With French summary. Refs. p.550-552.

DLC QE719.S83

Silicoflagellates have been used only occasionally in the Atlantic region mainly due to poor preservation in much of this region. A review of the pertinent literature suggests that silicoflagellates do possess potential for biostratigraphic and paleoecologic studies in the Atlantic. (Auth.)

E-31311

Vtiurin, B.I., Moskalevskiĭ, M.IU., **Cryogenic landforms of King George Island, South Shetland Islands** [Kriogennyĭ rel'ef ostrova King-Dzhordzh, IUzhnye Shetlandskie ostrova], *Geomorfologiia,* Jan.-March 1985 No.1, p.77-82, In Russian with English summary. 11 refs.

King George Island presents a variety of landforms of cryogenic-denudational, nival, solifluction and cryostructural types. A distinct pattern can be discerned in the landforms distribution which is controlled by geomorphology, climate and geocryological features of the island. Cryogenic landforms most typical for the island are described, such as cryogenic-denudational and solifluction terraces, nivation cirques, sorted polygons and circles and linear microforms due to frost heaving at slopes. (Auth.)

E-31319

Siders, M.A., Elliot, D.H., **Major and trace element geochemistry of the Kirkpatrick Basalt, Mesa Range, Antarctica,** *Earth and planetary science letters,* Jan. 1985 72(1), p.54-64, 32 refs.

Major and trace element geochemistry demonstrate that the Kirkpatrick Basalt (Ferrar Group) of Antarctica, a continental flood basalt sequence, includes two distinct compositional populations, referred to as low-Ti and high-Ti flows. All basalts are relatively evolved, particularly the high-Ti flows which exhibit marked Fe-enrichment. Data show that the basalts carry a marked crustal signature and also have some geochemical characteristics more commonly associated with calc-alkaline rocks. (Auth.)

E-31330

Berggren, W.A., **Toward a Quaternary time scale,** *Quaternary research,* May 1980 13(3), p.277-302, Refs. p.300-302.

DLC QE696.Q35

In the belief that an intra-Quaternary (bio)chronology is best founded upon the (bio)stratigraphic record in deepsea sediments, the authors correlated over 40 biostratigraphic datum levels to the geomagnetic-reversal scale and several datum levels to the oxygen-isotope stratigraphy (including several from the Antarctic-Subantarctic). These two iterative stratigraphies have in turn been calibrated to an ordinal geochronology, the radiometric time scale, thus providing a means of critically investigating the extent to which such events are synchronous or diachronous over the geographic extent of their distribution. The datum levels correlated to the magnetic scale and oxygen-isotope stratigraphy are illustrated.

E-31331

Clark, D.L., Whitman, R.R., Morgan, K.A., Mackey, S.D., **Stratigraphy and glacial-marine sediments of the Amerasian Basin, central Arctic Ocean,** Boulder, Geological Society of America, 1980, 57p., Refs. p.55-57.

DLC QE690.S8

As part of this study on central Arctic Basin stratigraphy and sedimentation processes (concluding that the bulk of the late Cenozoic sediment of the central Arctic is of ice-rafted, glacial-marine origin), samples from Arctic cores are compared with cores from the Weddell Sea, Ross Sea and Bellingshausen Sea. All sediments examined are found to exhibit similar silt-clay histogram types.

E-31368

Bradshaw, J.D., Weaver, S.D., **Suspect terranes in North Victoria Land, Antarctica,** Circum-Pacific Terrane Conference, Stanford, 1983. Proceedings. Edited by D.G. Howell, D.L. Jones, A. Cox and A. Nur, Stanford, Stanford University, 1984, p.36-39, 2 refs.

Three major units, the Wilson terrane in the west, the central Bowers terrane and the Robertson Bay terrane in the east, are described as the most striking feature of the geology of North Victoria Land. It is suggested that the region be considered a collage of slices assembled by strike-slip movement to overcome the geological problems of the three terranes in the reconstruction of a paleogeography-geological history in conventional plate tectonic terms.

E-31369

Christodoulou, C., Griffin, B.J., Foden, J., **Geology of Macquarie Island,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Sep. 1984 No.21, 15p., 11 refs.

The various rock lithologies present on Macquarie Island are described in detail together with their mode of occurrence and field relations. The four predominant rock types are pillow basalts, dolerite dykes, troctolites and gabbros, and ultramafics (mainly harzburgite). This sequence represents a section through the earth's oceanic crust. The dominant structural geological feature is faulting at any scale. Faulting also controls the evolution of the Macquarie Ridge complex, of which the uppermost part is the island. It is concluded that the sequence of rock units present on Macquarie Island generated at the Australian-Antarctic spreading ridge. (Auth.)

E-31384

Zinsmeister, W.J., **Late Eocene bivalves (Mollusca) from La Meseta Formation, collected during the 1974-1975 joint Argentine-American expedition to Seymour Island, Antarctic Peninsula,** *Journal of paleontology,* Nov. 1984 58(6), p.1497-1527, 37 refs.

The upper Eocene La Meseta Formation on Seymour Island contains one of the most important Tertiary marine faunas from the Southern Hemisphere. The fauna contains elements from both southern South America and Australasia and provides the key to the understanding of the biogeographic history of the southern circum-Pacific during the final breakup of Gondwana during the Early Tertiary and to the origin of many modern-day groups of Pacific molluscs. This paper describes 22 new species and 3 new genera of bivalves; ten previously described species are redescribed, figured and their Taxonomy modernized. (Auth.)

E-31388

Kaesler, R.L., Waters, J.A., **Census of Holocene species of *Xestoleberis* (Ostracoda, Podocopida) from the southern oceans,** *University of Kansas paleontological contributions,* Oct. 6, 1972 No.60, p.1-35, 29 refs.

DLC QE701.K33

Thirty-four species of *Xestoleberis* (including *Semixestoleberis*) were found in the southern oceans south of 30 S. latitude, although not all of these are endemic to the region. The original descriptions and subsequent descriptions and comments pertaining to these species are included as well as all lateral and dorsal views from previous publications. Five morphological characters were measured from drawings of lateral views of 67 carapaces. Analysis of these characters shows that height of the carapace is more strongly correlated with radius of curvature of the anterior and posterior portions than are either length or length-height ratio.

E-31391

Harriss, R.C., Crocket, J.H., Stainton, M., **Palladium, iridium and gold in deep-sea manganese nodules,** *Geochimica et cosmochimica acta,* Oct. 1968 32(10), p.1049-1056, 20 refs.

DLC QE351.G425

The abundance and distribution of palladium, iridium and gold has been determined in manganese nodules from widely varying locations and geological environments within the Atlantic, Indian and Pacific Oceans. The distribution of these metals is characterized by a lack of distinct regional variations, homogeneous distribution within an individual nodule, and a lack of any correlation with variations in major and other trace elements in the nodules. Assuming that all the iridium in the manganese nodules is of extraterrestrial origin, an upper limit on the mass accretion rate of interplanetary matter to the earth is calculated to be 60 tons/day over the surface of the earth. (Auth.)

E-31392

Robinson, P.H., Jaegers, A., **Lithologic logs of eastern Taylor Valley (ETV) cores 2 to 13, South Victoria Land, Antarctica,** New Zealand Geological Survey. Report G89, Lower Hutt, September 1984, 34p., 13 refs.

Thirteen holes were drilled to investigate the late Cenozoic glacial history of eastern Taylor Valley (ETV), Antarctica. Continuous coring was attempted in all holes with core recovery rates of between 43 and 98 percent. This report presents the graphic lithologic logs of ETV cores 2 to 13 at a 1:200 scale; the cores were initially logged at a 1:20 scale. (Auth.)

E-31393

Robinson, P.H., **Preliminary report on the lithostratigraphy and sedimentary history of the near surface glacigenic drill-core sediment of eastern Taylor Valley, Antarctica,** New Zealand Geological Survey. Report G77, Lower Hutt, October 1983, 26p., 13 refs.

A generalized sequence of gravel (drift), silt, sand, (sandy) diamicton, sand and (sandy) diamicton is recognized in the surface sediments and extending to the subsurface. A lithostratigraphy based on similarities in sediment texture and type is proposed here and a preliminary assessment of these sediments suggests an environment dominated by glacio-fluvial deposition but also influenced by episodes of ice margin and possible lake level fluctuations. The sediments of this sequence probably represent at least two Ross Ice incursions, the youngest being Ross I and reaching a maximum about 17-21,000 years B.P. Older events (e.g. Ross II and III) may be present and are inferred by the presence of sandy diamictons, separated by sand units. (Auth.)

E-31394

Lena, H., **Planktonic foraminifera from submarine cores in southwestern Atlantic (ELTANIN, cruise 22)** [Foraminíferos planctónicos de testigos submarinos del Atlántico Sudoccidental (ELTANIN, crucero 22)], *Revista española de micropaleontología,* 1982 14(1-3), p.137-144, In Spanish with English summary. 12 refs.

DLC QE701.R35

Late Pliocene and Pleistocene planktonic foraminifera in 6 cores collected in southwestern Atlantic by ELTANIN (cruise 22) were studied. Based on the determined species and their stratigraphic distribution the Late Pliocene-Pleistocene was divided into 4 faunistic zones. It was determined that the surface water temperature was lower during the Late Pliocene-Pleistocene than it is today. (Auth.)

E-31395

Elston, D.P., Robinson, P.H., Bressler, S.L., **Stratigraphy, sedimentology, and paleomagnetism of the coral ridge sand body, eastern Taylor Valley, Victoria Land, Antarctica,** *U.S. Geological Survey. Open-file report,* No.81-1303 52p. + 16p., 19 refs.

The Coral Ridge sand body is described as to thickness, depth, and orientation vis à vis Taylor Valley. Time deposition and the current major function of the ridge are suggested. A group of formation mechanisms is postulated but evidence for any one of them has not yet been developed. Two major possibilities for age determination of the ridge are also presented. Evidence here is also lacking for either argument.

E-31396

Yoshida, Y., **Geomorphological research in the past Japanese Antarctic Research Expeditions,** *Polar news,* Feb. 1984 No.38, p.2-8, In Japanese.

Five major conclusions are reached from analysis of JARE Data obtained by field surveys since 1957: 1) The ice sheet probably extended to the outer margin of the continental shelf, and all presently ice-free areas were buried by ice at an unknown time; 2) Lützow-Holm Bay seems to occupy a tectonically depressed area; 3) the last major shrinkage from the ice-free areas took place earlier than 30,000 years ago; 4) after the shrinkage of the ice sheet, parts of ice-free areas were submerged by the sea, and then have uplifted at least 20 meters since that time; and 5) the ice-smoothed surfaces with striations and grooves and some characteristic till suggest that the glacial erosion by wet-based glaciers took place not only in the coastal area but also in inland mountains.

E-31404

White, W.M., **Sources of oceanic basalts: Radiogenic isotopic evidence,** *Geology,* Feb. 1985 13(2), p.115-118, 34 refs.

Oceanic basalts can be subdivided into five distinct groupings on the basis of their Sr, Nd, and Pb isotope composition. These classes, represented by mid-ocean ridge basalts (MORB) and St. Helena, Kerguelen, the Society Islands, and the Hawaiian Islands, may represent different but internally heterogeneous mantle reservoirs or merely distinct groups within which chemical evolution has proceeded in a similar manner. Little systematic geographic distribution of volcanism tapping these sources is apparent. Depletion has been most important in the evolution of the MORB-type reservoirs, whereas crustal recycling has dominated the evolution of sources of the Kerguelen and Society types. Primitive mantle is identifiable in the Sr, Nd, Hf, and Pb isotope characteristics of the Hawaiian source only. The evolution of St. Helena-type sources remains enigmatic. (Auth.)

E-31405

Melosh, H.J., **Ejection of rock fragments from planetary bodies,** *Geology,* Feb. 1985 13(2), p.144-148, 35 refs.

The recent discovery of ALHA81005, a small meteorite that undoubtedly came from the moon, has raised questions about how an intact rock fragment could survive acceleration to planetary escape velocities. This acceleration could only have been produced by a large impact on the lunar surface. A small amount of material (0.005 to 0.02 projectile volume) may be ejected from an impact crater at speeds exceeding lunar escape velocity without suffering petrographically detectable shock damage. The ejected material is protected by stress-wave interference close to the free surface. The existence and size of this zone depend upon parameters such as the rise time of the stress pulse produced by an impact. The fragment size is a function of ejection velocity. The lunar meteorite was ejected during an impact event that produced a crater at least 3.6 km in diameter. Other meteorites may have originated in a similar way. (Auth.)

E-31407

Frazer, J.Z., Wilson, L.L., **Manganese nodule resources in the Indian Ocean,** *Marine mining,* 1980 2(3), p.257-292, Refs. p.289-292.

DLC TN291.5.M35

Available data on nodule composition and abundance in the Indian Ocean are presented. Five areas in which nodule deposits might meet the criteria for consideration as mineral resources are discussed. It is concluded that only one of these areas, in the Central Indian Basin, offers possible sites for first generation seabed mining; the others are submarginal at best. It is extremely unlikely that minable deposits occur in the Indian Ocean outside of the areas studied. Nodules appear to be absent on most of the ridges and near Antarctica. (Auth. mod.)

E-31408

McCall, P.L., ed, Tevesz, M.J.S., ed, **Animal-sediment relations. The biogenic alteration of sediments,** New York, Plenum Press, 1982, 336p., Refs. passim. For selected papers see E-31409 through E-31412.

DLC QH90.8.B46A54

The seven chapters of this book concern the effects of bottom-dwelling organisms on sediment properties. The animal-sediment relations in comparable aquatic environments are reviewed; information extracted from the rock record of those two environments adds a paleontological interest.

E-31409

Aller, R.C., **Effects of macrobenthos on chemical properties of marine sediment and overlying water,** Animal-sediment relations. The biogenic alteration of sediments. Edited by P.L. McCall and M.J.S. Tevesz, New York, Plenum Press, 1982, p.53-102, Refs. p.96-102.

DLC QH90.8.B46A54

The numerous ways in which macrobenthos alter the horizontal and vertical distribution of particles and solutes in marine sediments and alter the rate of diagenesis of organic matter are examined. Macrobenthos not only alter the flux of materials between sediments and the overlying water column, but also influence the temporal and spatial distributions of other benthic organisms. Tabulated results include data from antarctic pelagic sediments.

E-31410

Byers, C.W., **Geological significance of marine biogenic sedimentary structures,** Animal-sediment relations. The biogenic alteration of sediments. Edited by P.L. McCall and M.J.S. Tevesz, New York, Plenum Press, 1982, p.221-256, Refs. p.252-256.

DLC QH90.8.B46A54

Recent work on the relation of marine trace fossils to sedimentology that has appeared since the volume of Frey (1975) is reviewed. Some ideas about what these biogenic sedimentary structures can tell us about the history of life are presented. Illustrations of comparative traces from the Arctic and Antarctic deep-ocean floor are included. Diversity of complex feeding trails is much higher in the Antarctic in spite of the relatively larger food supply.

E-31411

Tevesz, M.J.S., McCall, P.L., **Geological significance of aquatic nonmarine trace fossils,** Animal-sediment relations. The biogenic alteration of sediments. Edited by P.L. McCall and M.J.S. Tevesz, New York, Plenum Press, 1982, p.257-285, Refs. p.281-285.

DLC QH90.8.B46A54

The meager knowledge concerning freshwater trace fossils is reviewed. The few excellent studies available serve as examples of the potential for reconstructing the physical-chemical properties of ancient aquatic substrata. A table, including Webby's (1968) work in Antarctica, shows that nonmarine trace fossils made by invertebrates are taxonomically diverse and environmentally widespread. Common tracemakers in these environments include molluscs, insect larvae and adults, annelids, and nematodes.

E-31412

Matisoff, G., **Mathematical models of bioturbation,** Animal-sediment relations. The biogenic alteration of sediments. Edited by P.L. McCall and M.J.S. Tevesz, New York, Plenum Press, 1982, p.289-330, Refs. p.327-330.

DLC QH90.8.B46A54

Various kinds of quantitative models that have been constructed to describe the effects of organisms on particle mixing and chemical mass transfer between sediment pore fluids and overlying waters are reviewed. Results obtained from different kinds of models are compared and suggesttions are made as to their utility in deciphering the sedimentary record of biological mixing.

E-31414

Torres G., T., Hansen, M.A., Troian, F.L., Fensterseifer, H.C., Linn, A., **Fossil flora of the Suffield Point area, King George Island, South Shetland Islands** [Flora fósil de alrededores de Punta Suffield, isla Rey Jorge, Shetland del Sur], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.1-7, In Spanish. 9 refs.

Paleobotanical investigations on King George Island are reported, with illustrations showing fossil taxa impressions found at Suffield Point, and maps indicating the areas investigated.

E-31428

Ross, C.A., Ross, J.R.P., **Carboniferous and early Permian biogeography,** *Geology,* Jan. 1985 13(1), p.27-30, 33 refs.

This review shows changes in the biogeographical distribution of shelf-dwelling, benthic marine invertebrates in response to changes in physical paleogeography and climatic variations. During the later part of the Visean and early part of the Namurian, the Hercynian orogeny, caused by the collision of Euramerica with Gondwana, disrupted cosmopolitan equatorial faunal patterns. This was also a time of progressively cooler temperatures throughout the world, of dramatic reduction in faunal diversity, and of high rates of extinction of both species and genera. During middle Carboniferous time, strongly provincial faunas were common. Faunal diversity gradually increased during the middle carboniferous and then declined at the end of the epoch with additional high levels of extinction of species and genera. During late Carboniferous time, several new faunal lineages became well established. Some filled vacant ecological niches; however, others took advantage of the increase in the number of niches that became available because of gradually warming climates. Provinciality continued to be pronounced. Diversity gradually increased and continued to do so through the Early Permian. (Auth. mod.)

E-31432

Peng, T.-H., Broecker, W.S., Kipphut, G., Shackleton, N., **Benthic mixing in deep sea cores as determined by C-14 dating and its implications regarding climate stratigraphy and the fate of fossil fuel CO2,** Fate of fossil fuel CO2 in the ocean. Edited by N.R. Andersen and A. Malahoff, New York, Plenum Press, 1977, p.355-373, 25 refs.

DLC GC117.C37F37

A series of radiocarbon dates on Indian Ocean core V19-188 reveals that this core was vertically mixed to a depth of 9 cm. Core top C-14 dates from a number of other, including subantarctic areas also indicate that the sediment has been mixed to a depth ranging from 6 to 18 cm. This mixing has important implications with regard to the fate of fossil fuel CO2. A numerical model has been developed to study the effect of sediment mixing on radiocarbon dates, carbonate concentrations, oxygen isotopes and fauna abundances. This model indicates that the deviation of apparent C-14 ages from the true age ranges from 530 years to 1800 years for core V19-188, with the maximum deviation at the climatic transition depth. (Auth.)

E-31433

Berger, W.H., **Carbon dioxide excursions and the deep-sea record: aspects of the problem,** Fate of fossil fuel CO2 in the ocean. Edited by N.R. Andersen and A. Malahoff, New York, Plenum Press, 1977, p.505-542, Refs. p.537-542.

DLC GC117.C37F37

Deep-sea sediments bear on the CO2 problem in three major ways: The sediment-ocean system is a powerful buffer for a geologically short-term CO2 pulse like the present industrial input; deep-sea sediments provide a detailed record of the natural background fluctuation in climate against which a CO2 induced change has to be measured; substantial CO2 excursions may have occurred in the past, leaving a record in deep-sea sediment. Climatic fluctuations are thought to be tied to a large extent to astronomical causes. To verify this hypothesis, the fluctuations of sedimentation rates in sediments unaffected by dissolution have to be determined. Excursions of the saturation level during the Pleistocene (taken as change in the compensation depth of *Globigerina rubescens)* exceed 1 km and interfere with the signal produced by productivity changes alone. The excursions should be recognizable in preservation and dissolution pulses or reversals, and in delta C-13 changes. (Auth. mod.)

E-31436

Johnston, J.H., **Desert varnish in Antarctica: a nuclear microprobe and backscattered Fe-57 Mössbauer spectroscopic study,** *Chemical geology,* Jan. 1984 42(1/4), p.189-201, 9 refs.

DLC QE515.C43

Nuclear microprobe analysis and backscattered Fe-57 Mössbauer spectroscopic methods have been used to study the desert varnish coatings on samples of dolerite and sandstone from the Taylor Valley area of the McMurdo Dry Valley region. With the nuclear microprobe method the oxygen content of the varnish coating and underlying bulk rock was measured directly. In addition, the iron, calcium and sulphur contents were measured using their characteristic proton-induced fluorescent X-rays. The concentration profiles of these elements are presented in three- and two-dimensional diagrammatic representations. These show that in the Fe-containing dolerites, the desert varnish is formed by subsurface leaching of the Fe from the bulk rock. This is transported to the surface and deposited as a coating of hydrous ferric oxide, probably ferrihydrite, by subsequent oxidation and evaporation. In the essentially Fe-deficient sandstone, the Fe is derived externally from the overlying dolerite sills and is similarly transported and deposited as a varnish coating on the upper surfaces of the sandstone. Windblown inorganic salts, notably thenardite, may be incorporated in the outer layers of the varnish. (Auth. mod.)

E-31437

Johnston, J.H., Cardile, C.M., **Characterisation of the iron oxide phase in desert varnish from Antarctica using backscattered conversion electron and X-ray Mössbauer spectroscopy,** *Chemical geology,* Aug. 1984 45(1/2), p.73-90, 26 refs.

DLC QE515.C43

The iron oxide phase in the desert varnish surface coatings on coarse- and fine-grained Ferrar dolerite, Aztec siltstone and orthoquartzite sandstone rocks from the Upper Taylor Valley area, McMurdo Dry Valley region, has been characterised using backscattered conversion electron and X-ray Mössbauer spectroscopy, and X-ray diffraction methods. The results suggest that the colour and extent of the desert varnish layer arises from the formation of a thin coating or staining of hydrous Fe-oxides on the primary minerals at or near the surface of the rock. On the sandstone, where the Fe is derived from an external source, the oxide coating is precipitated from solution relatively quickly. This forms a very poorly ordered hydrated ferric oxide polymer. On the fine-grained dolerites a more ordered hydrous Fe-oxide polymer resembling ferrihydrite is found. On the coarse-grained dolerites and also the siltstone, the Fe-oxide phase is a slightly less ordered ferrihydrite-like material. (Auth. mod.)

E-31439

Khristianova, L.A., Romankevich, Y.A., **Rate of sedimentation in deep water,** Washington, D.C., U.S. Naval Oceanographic Office, 1969, p.20-30, AD 695 305, 31 refs.

Investigations concerning the rate of sedimentation in the southern ocean are discussed and evaluated. Similarly, the results of various sampling and calculation methods are compared and evaluated, namely: radium, radio-ionic, ionic and thorium, berillium, protactinium-ionic, and radio-carbon methods.

E-31450

Miller, K.J., Leschine, S.B., **Halotolerant *Planococcus* from antarctic dry valley soil,** *Current microbiology,* 1984 11(4), p.205-209, 25 refs.

A halotolerant *Planococcus* (strain A4a) was isolated from saline Antarctic Dry Valley soil. *Planococcus* strain A4a grew over wide ranges of temperature (0-40C) and NaCl concentrations (0-2.0 M). When the NaCl concentration of the growth medium was increased, the total intracellular free amino acid concentration increased; however, the intracellular potassium concentration did not increase. This result suggested that intracellular free amino acids functioned as compatible solutes for growth of this strain at elevated NaCl concentrations. The halotolerant and psychrotolerant nature of the strain would appear to provide it with the capacity for growth in the saline Antarctic Dry Valley soil environment from which it was isolated. (Auth.)

E-31451

Faure, G., Hoefs, J., Mensing, T.M., **Effect of oxygen fugacity on sulfur isotope compositions and magnetite concentrations in the Kirkpatrick basalt, Mount Falla, Queen Alexandra Range, Antarctica,** *Isotope geoscience,* 1984 2(4), p.301-311, 18 refs.

The *delta* S-34 values of total sulfur in the Jurassic tholeiite flows on Mt. Falla in Antarctica range from -1.45 to +11.73 per mill. The concentrations of sulfur range from 80 to 480 ppm, which is typical of subaerial lava flows that lose varying proportions of sulfur by outgassing of SO2. The concentrations of magnetite range from less than 1% to more than 4% and appear to correlate inversely with the total Fe content of the flows. However, the five flows which are anomalously enriched in S-34 also have elevated magnetite concentrations. It is suggested that the elevated magnetite concentrations and the S-34 enrichment were both caused by high oxygen fugacities *f*O2 in the melt. The magnetite concentrations are affected by the fugacity of oxygen through equilibrium in the FMQ buffer whereas the enrichment of the flows in S-34 resulted from outgassing of SO2 at *f* O2 greater than .00000001 atm. The dependence of *delta* S-34 and the magnetite concentrations of the flows on *f*O2 is supported by the stratigraphic variation of these parameters and by their direct linear correlation.

E-31452

Faure, G., Botoman, G., **Origin of epigenic calcite in coal from Antarctica and Ohio based on isotope compositions of oxygen, carbon and strontium,** *Isotope geoscience,* 1984 2(4), p.313-324, 33 refs.

Isotopic compositions of oxygen, carbon and strontium of calcite cleats in coal seams of southern Victoria Land, and Tuscarawas County, Ohio, contain a record of the conditions at the time of their formation. The Antarctic calcites were deposited from waters enriched in O-16 whose isotopic composition was consistent with that of meteoric precipitation at low temperature and high latitude. The carbon of the calcite cleats was derived in part from the coal as carbon dioxide and by oxidation of methane or other hydrocarbon gases. The strontium originated primarily from altered feldspar grains in the sandstones of the Beacon Supergroup. Calcite cleats in the Kittaning No.6 coal seam of Ohio were deposited from waters that had previously exchanged oxygen, possibly with marine carbonates at depth. The carbon is enriched in C-13 even though the cleats were deposited in coal that is highly enriched in C-12 and apparently originated from marine carbonates. Strontium in the cleats is not of marine origin but contains varying amounts of radiogenic Sr-87 presumably derived from detrital Rb-bearing minerals in the adjacent sedimentary rocks. The results of this study suggest that calcite cleats in coal of southern Victoria Land were deposited after the start of glaciation in Cenozoic time and that those in Ohio precipitated from formation waters derived from the underlying marine carbonate rocks, probably in the recent geologic past. (Auth.)

E-31458

Zastawniak, E., Wrona, R., Gaździcki, A., Birkenmajer, K., **Plant remains from the top part of the Point Hennequin Group (Upper Oligocene), King George Island (South Shetland Islands, Antarctica),** *Studia geologica polonica,* 1985 81(5), p.143-164, With Polish summary and six plates. 32 refs.

Fossil plant remains from the Mount Wawel Formation (Point Hennequin Group, Upper Oligocene) at Admiralty Bay, King George Island, represented by imprints of leaves, shoots, and seeds are the first *in situ* fossil flora from this lithostratigraphic unit. The main components of the plant-fossil assemblage are the genus *Nothofagus* represented by numerous leaf impressions of various types, and the family Podocarpaceae represented by fragments of shoots and numerous seeds. Dicotyledonous leaf remains, *Cochlospermum* and ?Rhamnaceae, indicate a more diversified composition of *Nothofagus* Podocarpaceae palaeoassemblage during Late Oligocene times in West Antarctica. The Mount Wawel Formation taphocoenosis is similar to that of the Dragon Glacier morainic site, derived also from the same Point Hennequin Group. In both taphocoenoses, small-leaf (microphyll and notophyll) classes are in excess of 95 per cent which corresponds with the values of recent Australian Temperate (cool and warm) Rain Forest. (Auth.)

E-31469

Smith, J.V., Steele, I.M., **Achondrite ALHA 77005: alteration of chromite and olivine,** *Meteoritics,* Sep. 30, 1984 19(3), p.121-133, 55 refs.

The olivine crystals of the 77005 achondrite are brown except for colorless shock lamellae, mottled patches, and grains adjacent to pools of impact melt. Sporadic dark alteration patches in brown olivine and Cr-rich spinel were subjected to electron-microprobe examination and the analysis is given. Ion-microprobe analyses revealed H in both. Thermal metamorphism under dry oxidizing conditions is discussed as a possible alternative to shock-induced oxidation for generation of the brown olivine. Because alteration patches transgress shock lamellae, and because sulfatic alteration occurs in fusion crusts of Antarctic meteorites, alteration of the 77005 achondrite at the

Antarctic surface is preferred to a complex series of processes needed for pre-terrestrial alteration. (Auth. mod.)

E-31470

Rubin, A.E., Keil, K., **Size distributions of chondrule types in the Inman and Allan Hills A77011 L3 chondrites,** *Meteoritics,* Sep. 30, 1984 19(3), p.135-143, 31 refs.

A petrographic study of 9 thin sections of Inman (L3) and 18 thin sections of ALHA77011 (L3) served to determine the size-distributions of different chondrule textural types. Inman chondrules are significantly larger than those in ALHA77011, but in each chondrite there is no statistically significant difference between the size-distributions of barred olivine and radial pyroxene plus cryptocrystalline chondrules. In ALHA77011, barred olivine chondrules outnumber radial pyroxene plus cryptocyrstalline chondrules, whereas in Inman, the reverse is true. Suggestions as to how the sorting was accomplished are presented. (Auth.)

E-31472

Puig, A., Herve, M., Suarez, M., Saunders, A.D., **Calc-alkaline and alkaline Miocene and calc-alkaline Recent volcanism in the southernmost Patagonian Cordillera, Chile,** *Journal of volcanology and geothermal research,* June 1984 21(1/2), p.149-163, 22 refs.

In the southernmost Patagonian Cordillera (south of Lat. 54 deg 45') previously unrecorded calc-alkaline dacites and andesites, and adjacent alkali-basalts, were dated at 21 and 18 Ma (K-Ar), respectively. In the same area post-glacial low-K calc-alkaline andesites, identified at Isla Cook, represent the southernmost Recent volcanism recorded so far in South America, about 400 km south of Monte Burney, previously known as the southernmost Recent volcano. The association of contemporaneous calc-alkaline and alkali volcanics suggests a subduction-related environment for the Miocene volcanism, and the recent calc-alkaline volcanics indicate that currently there is a small component of subduction of the Antarctic Plate beneath the South American part of the Scotia Plate. (Auth.)

E-31473

Barker, P.F., **Plate tectonics of the Scotia Sea region,** *Nature,* Dec. 1970 228(5278), p.1293-1296, 29 refs.

An initial reconstruction of the Scotia Ridge region and of Mesozoic relative motion between parts of the present antarctic plate is presented. Dated and undated magnetic lineations, the fracture zones, trenches, the axis of the double bathymetric ridge, and the 2,000 m depth contour in the Scotia Sea are illustrated. Shown are also the distribution of epicenters of shallow focus earthquakes, compared magnetic profiles, and boundaries between African, South American, antarctic and Sandwich plates.

E-31475

Qingsong, Z., Peterson, J.A., **Geomorphology and Late Quaternary geology of the Vestfold Hills, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE reports,* 1984 No.133, 84p., Refs. p.81-84.

Structural, cryogenic and coastal landforms of the Vestfold Hills are described and an interpretation of evidence for Late Quaternary events is offered. Twelve types of periglacial landforms engendered by four agents are described. Periglacial landforms have developed on surfaces that have been ice-free for less than 5,000 years. Measurement of expansion and contraction of sorted circles showed that their development is active in summer and stable in winter. Since the late Pleistocene there have been at least two glacial cycles in the Vestfold Hills. Some of the present ice-free area was under the sea for an unknown duration ending about 25,000 years BP. From then until about 10,000 years BP ice covered the present ice-free area with a minimum thickness of 158 m. The period 6,000-5,000 years BP was one of milder climate with relative sea level higher than that at present so that many valleys were invaded by the sea in which there was abundant plant and animal life. Glacio-isostatic uplift has caused regression and a fall of about 15 m in relative sea level during the last 6,000 years. A series of young recessional ice-cored shear moraines reflect ice fluctuation that may correspond with Middle to Late Holocene ice advance and retreat documented in other parts of the world. Ice fronts are still in retreat. (Auth.)

E-31488

Gaździcki, A., Gradziński, R., Porebski, S.J., Wrona, R., **Pholadid *Penitella* borings in glaciomarine sediments (Pliocene) of King George Island, Antarctica,** *Neues Jahrbuch für Geologie und Paläontologie. Monatshefte,* Dec. 1982 No.12, p.723-735, With German summary. 20 refs.

In a proglacial marine sequence moulds of pholadid bivalve borings containing shells of *Penitella* sp. have been observed on the soles of several pebbly sandstone and sandstone beds. The borings penetrate the mudstone substratum to a depth of 10 cm and are filled with coarse sand from the overlying beds. The *Penitella* community inhabited muddy portions of the sea bottom during fair-weather periods and was buried by rapid sediment gravity flows which repeatedly delivered coarse clastics to this low-energy environment. (Auth.)

E-31489

Sheraton, J.W., Collerson, K.D., **Geochemical evolution of Archaean granulite-facies gneisses in the Vestfold Block and comparisons with other Archaean gneiss complexes in the East Antarctic Shield,** *Contributions to mineralogy and petrology,* 1984 87(1), p.51-64, Refs. p.62-64.

The Vestfold Block consists predominantly of felsic orthogneiss (Mossel and Crooked Lake gneisses), with subordinate mafic granulite and paragneiss. Two major periods of continental crust formation are represented. The Mossel Gneiss, metamorphosed about 3,000 Ma ago, is mainly of tonalitic composition, and is similar to the Napier Complex in Enderby Land. The Crooked Lake gneiss was emplaced under high-grade conditions about 2,450 Ma ago and comprises a high proportion of more potassic monzodioritic and monzonitic suites. Both Mossel and Crooked Lake gneisses are depleted in Y and have moderate to high Sr, Ce/Y, and Ti/Y, consistent with melting of a mafic source. Crooked Lake gneisses are more enriched in incompatible elements (P, Sr, La, Ce, and particularly Rb, Ba, and K) than Mossel gneisses, suggesting derivation from a more enriched mafic source. (Auth. mod.)

E-31491

Szaniawski, H., Wrona, R., Gaździcki, A., **Significance of paleontological research in Antarctica and the contribution of Polish scientists** [Znaczenie badan paleontologicznych w Antarktyce i udzial Polakow w ich realizacji], *Kosmos,* 1983 32(2), p.333-344, In Polish. 33 refs.

After a brief review of antarctic geological history, the paleontological findings are considered; the literature is reviewed, and the particular projects in which Polish scientists participated, after Poland's signing of the Antarctic Treaty, and the sites where the research took place, are discussed and illustrated.

E-31497

Grew, E.S., **Surinamite, taaffeite, and beryllian sapphirine from pegmatites in granulite-facies rocks of Casey Bay, Enderby Land, Antarctica,** *American mineralogist,* Sep.-Oct. 1981 66(9/10), p.1022-1033, 33 refs.

Surinamite, taaffeite, beryllian sapphirine, niobian rutile, chrysoberyl, and wagnerite occur in sillimanite-rich, medium-grained segregations in two pegmatites of probable late Archean age which cut granulite-facies rocks near McIntyre Island in Casey Bay. Mineralogic descriptions are given of the discovered surinamite, taaffeite, and sapphirine. Stable mineral assemblages in the segregations at the time the pegmatites crystallized are quartz-sillimanite-surinamite-biotite-orthopyroxene-garnet, quartz-surinamite-taaffeite, sillimanite-garnet-biotite-surinamite-taaffeite-sapphirine, and sillimanite-garnet-biotite-chrysoberyl-surinamite. Temperatures and pressures at the time of pegmatite emplacement are estimated to have been 800-900 C and 7-8 kbar. The Archean beryllian pegmatites are interpreted to be of magmatic origin and may be related to charnockitic plutonic rocks such as the body exposed on Tange Promontory 70 km to the west. (Auth. mod.)

E-31498

Berkley, J.L., Keil, K., **Olivine orientation in the ALHA77005 achondrite,** *American mineralogist,* Nov.-Dec. 1981 66(11/12), p.1233-1236, 11 refs.

ALHA77005, a unique achondrite found in the Allan Hills area, Antarctica, contains cumulus olivine and chromite phenocrysts poikilitically enclosed by pyroxene and maskelynite. Petrographic analysis of olivine microstructures suggests an approach to equilibrium grain orientation in response to laminar flow lines in a fluid medium. Orientation effects caused by grain-to-grain contact are probably of minimal importance. ALHA77005 is an example of a cumulate rock solidified in the act of flow and accumulation. Olivine orientations closely mimic patterns in porphyritic, tabular bodies (dikes, sills, flows). (Auth. mod.)

E-31501

Fudali, R.F., Kreutzberger, M., Kurat, G., Brandstätter, F., **Aspects of a glassy meteorite from the moon bearing on some problems in extraterrestrial glass-making,** *Journal of non-crystalline solids,* 1984 Vol.67, p.383-396, 23 refs.

Antarctic meteorite ALHA 81005 is a glassy piece of lunar highland regolith breccia. Not only is it a unique meteorite but the glasses contained therein probably come close to spanning the PT range that lunar impact-generated glasses have experienced. The glasses that formed near the upper end of this range are particularly instructive. They are optically and chemically homogeneous, contain no bubbles or relict minerals and are perfectly colorless. Color aside, these are features that have been previously attributed to lunar volcanic glasses. They are also characteristic of most tektites and have been offered as evidence against an impact origin for these important glasses and, by default, for a lunar volcanic origin. Both these positions are no longer tenable. (Auth.)

E-31503

Gaździcki, A., ***Chlamys* coquinas in glaciomarine sediments (Pliocene) of King George Island, West Antarctica,** *Facies,* 1984 Vol.10, p.145-152, With German summary. 18 refs.

Results of an analysis of specimens collected by the 3rd and 5th Polish Antarctic Expeditions (1978-79 and 1980-81) are reported. The fossiliferous glacio-marine sequence of the *Pecten* conglomerate (=Low Head Member of the Polonez Cove Formation) of King George Island is found to contain numerous pelecypod shells of *Chlamys anderssoni* (HENNIG), which sometimes form lumachelles. These allochthonous coquinas, often with intraclasts, can be interpreted as storm deposits (tempestites). Their mode of distribution in the deposits of the Low Head Member suggests that sedimentation of this sequence was episodically interrupted by storm-generated energy events resulting in resedimentation of the biota assemblages. (Auth.)

E-31569

Splettstoesser, J.F., **Note on rock striations caused by penguin feet, Falkland Islands,** *Arctic and alpine research,* Feb. 1985 17(1), p.107-111, 13 refs.

Unusual striations on the surfaces of a well-indurated sandstone in the Falkland Is. have been caused by claws on the feet of rockhopper penguins over a long period of time. These striations, when combined with organic remains, have potential as evidence for locating "fossil" breeding sites and age-dating of former sea levels. (Auth.)

E-31573

Splettstoesser, J.F., **Antarctic geology and mineral resources,** *Geology today,* March-Apr. 1985 1(2), p.41-45, 6 refs.

The geology of Antarctica is similar in many respects to that of the other southern continents that once formed the larger continent of Gondwana. Because of this former union with other land masses, mineral resources in Antarctica are probable, but none of any significance have been found, perhaps because of the widespread cover (97%) of ice over the continent. Offshore oil and gas are presently unknown, but would seem to hold the best prospect for any development in the near future, but perhaps not until questions of sovereignty and ownership of potential resources are resolved. (Auth.)

E-31577

Stump, E., Smit, J.H., Self, S., **Reconnaissance geologic map of the Mt. Blackburn quadrangle, Transantarctic Mountains, Antarctica,** U.S. Antarctic Research Program Mt. Blackburn Quadrangle Antarctic Geologic Map A-12, Reston, Va., U.S. Geological Survey, 1985, 1 sheet, 16 refs.

Eight map units are explained and described: from the Jurassic the Ferrar Group; from the Permian the Beacon Supergroup; from the Pennsylvanian a nonconformity and an angular unconformity (Kukri erosion surface); from the Ordovician and Cambrian the Granite Harbor Intrusives, Zanuck granite, and Tourmaline-bearing granite; from the Pre-Cambrian the Ackerman, Wyatt, and La Gorce Formations. Structural characteristics of the region are given and various rock types are identified.

E-31585

Butterworth, P.J., **Sedimentation of Ablation Valley, Alexander Island,** *British Antarctic Survey. Bulletin,* Feb. 1985 No.66, p.73-82, 18 refs.

Ablation Valley in the Fossil Bluffs Formation is described and its geological history outlined. A schematic section through part of the Fossil Bluffs as exposed in Ablation Valley is included and shows the fabrics of the formation as mudstone, alternating siltstone/sandstone, sandstone, pebbly mudstone, and conglomerate.

E-31593

Funaki, M., **Natural remanent magnetization of the Napier Complex in Enderby Land, East Antarctica,** *Antarctic record,* Dec. 1984 No.83, p.1-10, With Japanese summary. 11 refs.

Paleomagnetic studies were performed with the oldest rocks reported (about 3800 m.y.), collected from the Napier Complex in East Antarctica. Five specimens have stable NRM against AF and thermal demagnetizations, but other five have unstable one. The main NRM carriers in the former specimens are pure magnetite of single-pseudosingle domain structure. The Napier Complex was remagnetized completely in the amphibolite facies metamorphism 2500 m.y. ago. Since the cooling rate of the Complex was very slow at that time, it recorded the changing geomagnetic field. The most reliable NRM direction obtained is -82.9 deg inclination and 39.3 deg declination by thermal demagnetization to 480C, and the corresponding VGP position is calculated to be latitude 75S and longitude 14.5E. (Auth.)

E-31595
Tani, M., Kawasaki, I., **Why is seismic activity low in Antarctica,** *Antarctic record,* Dec. 1984 No.83, p.29-36, With Japanese summary. 13 refs.

Oceanic intraplate earthquakes which occurred in the oceanic lithosphere show the following features: the level of oceanic intraplate seismicity appears to increase from high latitudes to low latitudes; the level of oceanic intraplate seismicity appears to increase with the absolute velocity of the movement of the oceanic plate; both the level of oceanic intraplate seismicity and the maximum seismic moment of intraplate earthquakes appear to decrease with age of the ocean floor, which can be regarded as a rough approximation of the distance from an axis of the mid-oceanic ridge. This means that the ridge push force is dissipated while guided through the oceanic lithosphere. The potential cause of low seismic activity in Antarctica can be summarized as follows: Antarctica is situated in very high latitudes; the absolute velocity of the movement of the Antarctic plate is small; and because Antarctica is distant from the axes of the mid-oceanic ridge, the continent is almost free from ridge push force. (Auth.)

E-31596
Tomiyama, C., Kitano, Y., **Mass balance of salts in Lake Vanda,** *Antarctic record,* Dec. 1984 No.83, p.37-50, With Japanese summary. 17 refs.

Two sediment cores, DVDP 4A and DVDP 14, taken from the Wright Valley, were analyzed by using a selective chemical leaching technique. The partitioning of chemical elements into each mineral species in the sediment was clarified. By using the results, the mass balance of salts in Lake Vanda was calculated and the age of Lake Vanda was estimated to be about 7,000 years. (Auth.)

E-31601
Quilty, P.G., **Mesozoic and Cenozoic history of Australia as it affects the Australian biota,** *Australian National Antarctic Research Expeditions. ANARE research notes,* March 1985 No.24, p.7-55, 141 refs. Reprinted from Arid Australia, edited by H.G. Cogger and E.E. Cameron, Sydney, Australian Museum, 1984.

This work provides a geological background to the question of aridity in Australia and the effects of that aridity on the flora and fauna in the Triassic-Pleistocene interval. The Mesozoic-Cenozoic time scale presented shows the breakup history of Antarctica, New Zealand, Greater India and the Northwest. Discussion of climatic zones deals with the geological evidence that the Maastrichtian rocks of Antarctica contain warm water foraminifera suggesting warm marine conditions even close to the position of the South Pole. It is suggested that in the Triassic the boundary between Australia and Antarctica, unlike the remaining Gondwana margins, shows no sign of tension or compression at the time. The onset and progress of the separation of the Australian and antarctic plates over different geological eras are discussed and illustrated.

E-31621
Thiel, K., **Investigations of cosmic dust in the antarctic shelf ice** [Untersuchungen von kosmischem Staub aus antarktischem Schelfeis], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.104-112, In German with English summary. 10 refs.

During the German Antarctic Expeditions 1980/81 and 1982/83 approx. 4 tons of shelf ice were recovered from Atka Bay near the Georg von Neumayer Station. The aim of the study was to isolate and analyze potentially extraterrestrial dust particles. About 650 spherules extracted from the ice by filtration were investigate Most of the particles exhibit an elemental pattern which can be closel related to meteoritic matter. The mass frequency distribution of th spherules yields global influx rates of 49,000 t/a for metallic particle and 6000 t/a for glassy particles in the mass range >1,000,000g. comparison with the interplanetary dust complex indicates that th cosmic particle flux in the mass range .000001g...1000g could possibl be higher than has been estimated up to now. (Auth.)

E-31631
Quintas, G., Rangel Nunes, M., **Rock fragments collected on King George Island** [Fragmentos de rochas coletados n ilha Rei George], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.22-23, In Portuguese.

Five different types of rock found on King George I. in the vicin ty of Comandante Ferraz Station are listed and described: milky whit quartz, brown silex, gray basalt, grey silex and brown basalt.

E-31635
Yoshida, M., **History of Antarctica** [Nankyoku tairiku no oitachi], *Chiri,* March 1983 38(3), p.11-19, 9 refs., In Japanese.

The history of Antarctica, like other continents, goes back t remote antiquity beginning with the formation of the earth's crus The whole history of this continent, spanning approximately 40 billio years to date, was just recently depicted by Grikurov (1977-1982) the Soviet Union. This article is based on Grikurov's tectonic ma of Antarctica, which shows the history and development of the geo logical structure of Antarctica. The various problems related to geo chronology are discussed.

E-31654
Bud'ko, V.M., Kamenev, E.N., **First attempt at structural interpretation of Landsat images of west antarctic mountain regions** [Pervyĭ opyt strukturnogo deshifrirovaniia kosmicheskikh fotosnimkov gornykh raĭonov Zapadnoĭ Antarktidy], *Antarktika; doklady komissii,* 1985 No.24, p.43-49, In Russian. 10 refs.

A scheme of the structural ruptures and tectonic folds of th southeastern area of the Antarctic Peninsula is presented. The meth od used in the interpretation of Landsat images is described as show ing the geological contours under the ice sheets.

E-31655
Bud'ko, V.M., **Geological interpretation of satellite photographs of antarctic mountain regions** [Osobennosti geologicheskogo deshifrirovaniia kosmicheskikh fotosnimkov gornykh raĭonov Antarktidy], *Antarktika; doklady komissii,* 1985 No.24, p.50-55, In Russian.

The use of satellite photographs of the continental ice cover fo the determination of the geological structure of glacier beds is dis cussed. The ice surface topography is classified according to its rela tionship with the topography of the subglacial terrain and the geologi cal structure of the area.

E-31656
Kadmina, I.N., Kurinin, R.G., **Possible impact of sheet glaciation on the thermodynamic regime of the antarctic Earth crust and its neotectonic evolution** [O vozmozhnom vliianii pokrovnogo oledeneniia na termodinamicheskiĭ rezhim zemnoĭ kory Antarktidy i na ee neotektonicheskuiu evoliutsiiu], *Antarktika; doklady komissii,* 1985 No.24, p.56-64, In Russian. 11 refs.

A study of ice cover effects on the thermodynamics of the continental lithosphere is presented. The peculiarities of crustal fragmentation related to temperature increase in the development of the lithosphere, and the consequences of the rapid decrease of ice load, are described.

E-31657

Kameneva, G.I., Mikhal'skiĭ, E.V., **Basic distribution patterns of coal-bearing deposits in Antarctica** [Osnovnye zakonomernosti rasprostraneniia uglenosnykh otlozheniĭ v Antarktide], *Antarktika; doklady komissii,* 1985 No.24, p.65-75, In Russian. 13 refs.

The distribution of coal deposits in the Transantarctic Mountains where they extend over 2500 km, from Victoria Land to the Horlick Mountains, is discussed and mapped. The layer correlation and qualitative and quantitative peculiarities of the deposits are described.

E-31658

Bardin, V.I., Belevich, A.M., **Early glacial deposits in the Prince Charles Mountains** [K izucheniiu rannelednikovykh otlozheniĭ v gorakh Prins-Charl'z], *Antarktika; doklady komissii,* 1985 No.24, p.76-81, In Russian. 7 refs.

Investigation of diatom flora, spores and pollen found in porous layers of early glacial deposits at the northern side of Prince Charles Mountains is reported. The findings show that the sediments investigated developed under conditions prevailing in littoral areas, in desalinated waters of no more than 5 deg C temperature. The sediment formation is estimated to be Early Miocene.

E-31662

Shmideberg, N.A., Bardin, V.I., **Formation of chemical composition of lake waters in the periglacial zone of East Antarctica** [Osobennosti formirovaniia khimicheskogo sostava vod ozer v perigliatsial'noĭ zone Vostochnoĭ Antarktidy], *Antarktika; doklady komissii,* 1985 No.24, p.107-127, In Russian. Refs. p.126-127.

Investigations carried out over a period of 10-15 years show the following: the chemical composition of lake waters at the foot of glaciers in East Antarctica consists basically of two types, the sulfate type and the chloride type; high concentrations of these elements in the majority of lakes are of atmospheric origin; the biological productivity is low; the salinity is related to the morphological measurements of the lakes and to their distance from the ocean.

E-31671

Chumakov, N.M., **Principal glacial events of the past and their geologic significance,** *International geology review,* Aug. 1984 Vol.26, p.869-888, Translated from Akademiia nauk SSSR. Seriia geologicheskaia, 1984, No.7, p.35-53. 85 refs.

This is a comprehensive review of glaciations through geologic time, including discussion of stratigraphic and geographic distribution of glacial deposits, glacial eras, glaciations and the position of continents, asymmetry of glaciations, glaciations and climatic belts, and effects of glaciations on geologic processes. Traces of more extensive glaciations in Antarctica are reported as being found in the Carboniferous and Permian, Upper Oligocene to Miocene, Pliocene and Quaternary. Charts of climatic zonality during various geological eras, showing that Pliocene glaciations were more extensive in Antarctica than in the Northern Hemisphere, are presented.

E-31672

Narebski, W., **Cumulate origin of high-alumina basalts in specific calc-alkaline series of the South Shetland arc, West Antarctica,** Symposium on goechemistry of endogenous and exogenous processes, edited by B. Cambel, Bratislava, Vedy, 1983, p.215-240, With Russian summary. Refs. p.237-240.

High-alumina basalts are a characteristic member of specific calc-alkaline series of the South Shetland Is. arc in which basaltic andesite lava flows distinctly predominate over these rocks and andesites, as well as over volcanoclastic products. The mode of occurrence of these basalts, their petrographic and geochemical characteristics indicate them to be erupted cumulate plagioclase crystal fraction of parent basaltic andesite magma formed by intra-arc fracturing and subsequent crystal fractionation in a shallow crustal chamber. This model can be also valid for the origin of other high-alumina basalts of pericontinental island-arc volcanic series developed in the stage preceding a back-arc spreading. (Auth.)

E-31677

Klausewitz, W., **Zoogeography and the continental drift theory** [Die Zoogeographie und die Kontinentalverschiebungs-Theorie], *Natur und Museum,* Nov. 1980 110(11), p.332-341, In German. Refs.

DLC QH5.S4

Reconstruction of the drifting continents is discussed on the basis of the similarity of their flora and fauna. Gondwanaland is described and illustrated, showing that *Lystrosaurus* used to roam in Africa, southern Asia and Antarctica, and that the plant *Glossopteris* grew on all the southern continents.

E-31684

Goodrich, C.A., Taylor, G.J., Keil, K., Boynton, W.V., Hill, D.H., **Petrology and chemistry of hyperferroan anorthosites and other clasts from lunar meteorite ALHA81005,** *Journal of geophysical research,* Nov. 15, 1984 89(Supplement), Lunar and Planetary Science Conference, 15th, Proceedings, Pt. 1, p.C87-C94, 19 refs.

Antarctic meteorite Allan Hills A81005 (hereafter, 81005) is a polymict, anorthositic, regolith breccia of lunar origin. The authors have separated 14 new subsamples from 81005 for consortium study. The purpose was to further characterize the population of lithic clasts in 81005 source and their relation to known lunar rock types, to search for new lunar rock types, and to gain information about the 81005 source region. The results of petrographic and chemical studies of 11 of the separated samples are reported. A summary of the lithologies of these clasts is given.

E-31685

Delaney, J.S., Prinz, M., Takeda, H., **Polymict eucrites,** *Journal of geophysical research,* Nov. 15, 1984 89(Supplement), Lunar and Planetary Science Conference, 15th, Proceedings, Pt. 1, p.C251-C288, Refs. p.C283-C288.

The polymict eucrites are a suite of about 14 polymict achondritic meteorites that contain at least 90% (vol) of eucritic material and are found both in Antarctica and elsewhere. Samples from all the polymict eucrite suites have been documented and comparisons made with other polymict eucrites and with the howardites, eucrites, cumulate eucrites, and diogenites. Many antarctic polymict eucrites have been intensively studied by various research consortia organized by both NASA and NIPR. As a result, more carefully constrained and internally consistent data are available for these meteorites than for most basaltic achondrites.

E-31686

Jull, A.J.T., Donahue, D.J., Zabel, T.H., Fireman, E.L., **Carbon-14 ages of antarctic meteorites with accelerator and small-volume counting techniques,** *Journal of geophysical research,* Nov. 15, 1984 89(Supplement), Lunar and Planetary Science Conference, 15th, Proceedings, Pt. 1, p.C329-C335, 25 refs.

Carbon-14 terrestrial ages of six antarctic meteorites have been measured by accelerator mass spectrometry. These six and three additional antarctic meteorites were also measured by small counters. Yamato 75102 was found to be the youngest meteorite yet measured from the antarctic collections. The ages for the Yamato meteorites are younger than those from sites in the Allan Hills region. (Auth. mod.)

E-31688

Funaki, M., **Investigation of the paleomagnetism of the basement complex of Wright Valley, Southern Victoria Land, Antarctica,** *Journal of geomagnetism and geoelectricity,* 1984 36(11), p.529-563, Refs. p.561-563.

The basic magnetic properties, hysteresis, AF demagnetization, thermal demagnetization and thermo-magnetic properties of samples from five kinds of formations in the basement complex of Wright Valley were measured. The overall results are summarized as follows. The rocks now forming the floor of Wright Valley were heated to 500C in the Jurassic by a hidden Ferrar dolerite body. Consequently primary magnetization was remagnetized for the samples which have a Curie point lower than 500C, but survived for the samples included in magnetite grains. Virtual geomagnetic pole (VGP) positions obtained for samples of Cambro-Ordovician age rocks are consistent with previous data from rocks of the same age in East Antarctica, the VGP being situated near the equator of Africa on the present continental distribution. The differences in the declination of the Cambro-Ordovician from East Antarctica are consistent with an angular rifting of 20-30 deg having occurred subsequently within East Antarctica, probably along the line of the Amery Ice Shelf and Lambert Glacier. The Transantarctic Mountains are a part of East Antarctica and the boundary between East and West Antarctica may be located in the Ross-Weddell Sea. (Auth. mod.)

E-31705

Ivanov, V.L., Grikurov, G.E., Kameneva, G.I., **Tectonic evolution and structure of sedimentary deposits of antarctic shelf basins** [Tektonicheskaia evoliutsiia i stroenie osadochnogo chekhla shel'fovykh basseĭnov Antarktiki], Geologiia i geomorfologiia shel'fov i materikovykh sklonov (Geology and geomorphology of shelves and continental slopes). Edited by M.N. Alekseev, Moscow, Nauka, 1985, p.123-130, In Russian. 15 refs.

The structural and morphological classification of young sedimentary basins in the Antarctic is discussed. Maps of Wilkes Land and Victoria Land basins, in East Antarctica, and those in the seas of Bellingshausen, Amundsen, Weddell and Ross, in West Antarctica, are shown, and their formation and composition are described.

E-31707

Traube, V.V., **Antarctic sedimentary basins** [Osadochnye basseĭny Antarktiki], Neftegazonosnost' Mirovogo okeana (Petroleum and gas deposits beneath the oceans). Edited by I.S. Gramberg and IU.N. Kulakov, Leningrad, 1984, p.73-83, In Russian. 21 refs.

Sedimentary basins in Antarctica and the ocean basins in the circum-Antarctic region are described and compared; their nomenclature and distribution are shown on a chart; the geological sedimentary structure of, and the geological time periods present in each are given.

E-31730

Whiticar, M.J., Suess, E., Wehner, H., **Thermogenic hydrocarbons in surface sediments of the Bransfield Strait, Antarctic Peninsula,** *Nature,* Mar. 7, 1985 314(6006), p.87-90, 25 refs.

The authors discovered thermogenic hydrocarbons in unconsolidated Recent sediments from the King George Basin, Bransfield Strait, west Antarctica. These sediments possessed a marked petroliferous smell throughout the length of the 8.6 m gravity core. The basin sediments are glacial marine deposits dominated by turbidites and contain abundant autochthonous organic matter as a result of high seasonal primary productivity in this most fertile part of the circumpolar ocean. The maturation of this material into hydrocarbons may have been accelerated by the high geothermal gradient in the basin, associated with back-arc spreading created by the subduction of the Drake Plate into the South Shetland trench. Sediments in this rifted basin are frequently intruded by volcanic sills and dykes giving rise to acoustic features. The presence of these thermogenic hydrocarbons provides the first demonstration of active source rocks in Antarctica. (Auth.)

E-31731

Cervelle, B., **Meteorites in antarctic ice** [Des météorites dans les glaces de l'Antarctique], *Recherche,* Nov. 1984 15(160), p.1454-1456, In French. 6 refs.

The Japanese and American discoveries of large meteorite fields in the Yamato Mountains and Allan Hills are reviewed. The mechanisms leading to the accumulation of meteorites in specific locations are explained. Advances in chemical and isotopic analyses are described and possible lunar and Martian origins are considered for some of the meteorites.

E-31736

Watkins, N.D., Paster, T.P., **Magnetic properties of igneous rocks from the ocean floor,** *Royal Society of London. Philosophical transactions. Series A,* 1971 Vol.268, p.507-550, Refs. p.549-550.

DLC Q41.L8

The measured magnetic properties of submarine igneous rocks, comprising data from approximately 300 specimens, are summarized. Basaltic rocks dominate the collection numerically, and are distinguished by their high Q (ratio of remanent to induced magnetic intensities). Limited numbers of altered samples indicate that spilitization, chloritization, and serpentinization can drastically reduce the intensity of magnetization. The available thermomagnetic data suggest that low Curie points may be typical of quenched basalts. New data are presented. These include the magnetic properties of harzburgites dredged from the Macquarie Ridge, and eight pillow basalts from the South Pacific and Scotia Sea. The former suggest that harzburgite is capable of creating strong magnetic anomalies. Samples for the latter study were sufficiently large for study of the variation of magnetic and petrological properties with depth beneath the cooling surface. It is concluded that the submarine basalt magnetic properties which have so far been determined are largely a function of quenching, in contrast with the data from lavas outcropping above sea level which have generally experienced longer cooling periods, and which therefore include a greater range of titanomagnetite grain size and oxidation states. (Auth. mod.)

E-31737

Schilling, J.-G., **Sea-floor evolution: rare-earth evidence,** *Royal Society of London. Philosophical transactions. Series A,* 1971 Vol.268, p.663-706, Refs. p.705-706.

DLC Q41.L8

A systematic survey of rare-earth (r.e.) abundances in submarine tholeiitic basalts along mid-oceanic ridges has been made by neutron activation analysis. The r.e. fractionation patterns are remarkably uniform along each mid-oceanic ridge and from one ridge to another (Juan de Fuca Ridge, East Pacific and Chile Rise, Pacific-Antarctic, Mid-Indian and Carlsberg Ridge, Gulf of Aden, Red Sea Trough and Reykjanes Ridge). The patterns are all depleted in light r.e. except for three samples (Gulf of Aden and Mid-Indian Ridge) which are unfractionated relative to chondrites. They contrast markedly with tholeiitic plateau basalts which are shown to be related to the early volcanic phases associated with continental drift. Tholeiitic plateau basalts are light r.e. enriched as are most continental rocks. Models for r.e. composition of the upper mantle source of ridge basalt, formation of layers 2 and 3, and the moho-discontinuity, are presented. (Auth. mod.)

E-31738

Kyte, F.T., Brownlee, D.E., **Unmelted meteoritic debris in the Late Pliocene iridium anomaly: Evidence for the ocean impact of a nonchondritic asteroid,** *Geochimica et cosmochimica acta,* May 1985 49(5), p.1095-1108, Refs. p.1107-1108.

Ir-bearing particles have been recovered from 2 piston cores in the Antarctic Basin in the southeastern Pacific. In core E13-3 the particles closely correspond to the Late Pliocene Ir anomaly. Particles with diameters from 0.5 to 4 mm contain at least 35% of the Ir in this horizon. Three types of particles have been identified: vesicular, basaltic, and metal. The vesicular particles appear to be shock-melted debris derived from the oceanic impact of a howarditic asteroid containing a minor metal component. These particles have recrystallized from a melt and impact into the ocean has resulted in the incorporation of Na, K, Cl, and radiogenic Sr from the ocean water target. The basaltic clasts appear to be unmelted fragments of the original asteroid which may have separated from the main body prior to impact. Combined vesicular and basaltic particles are believed to have formed by collisions in the debris cloud. Estimates of the diameter of the projectile range from 100 to 500 m. By many orders of magnitude this is the most massive achondrite sampled by a single meteorite fall. (Auth.)

See also:
A-29486 A-30199 A-30806 A-31429 B-29049 B-29153 B-29289
B-29396 B-29456 B-29463 B-29595 B-30291 B-30349 B-30420
B-30456 B-30690 B-30691 B-31091 B-31097 B-31134 B-31162
B-31177 B-31178 B-31233 B-31568 B-31581 B-31633 B-31728
C-30151 C-30622 C-31135 C-31254 F-28964 F-28971 F-29077
F-29112 F-29128 F-29277 F-29420 F-29422 F-29478 F-29568
F-29594 F-29603 F-29607 F-29633 F-29863 F-30403 F-30405
F-30437 F-30484 F-30514 F-30849 F-30910 F-31636 F-31646
F-31678 G-29659 G-31534 G-31564 I-29105 I-29606 I-29804
I-29934 I-30449 I-30699 I-30976 I-31257 J-28993 J-28994
J-29082 J-29589 J-29592 J-29611 J-30515 J-30520 J-30923
J-31234 J-31434 J-31642 J-31643 K-30945 L-29007 L-29522
L-29555 L-29556 L-29590 L-29612 L-29613 L-29614 L-29615
L-29618 L-29626 L-29632 L-29646 L-29791 L-30239 L-30271
L-30398 L-30409 L-30757 L-30909 L-30911 L-31152 L-31224
L-31236 L-31402 M-29707 M-29819

F. ICE AND SNOW

F-28964
Drewry, E.J., comp, **Antarctica: glaciological and geophysical folio,** Cambridge, England, Scott Polar Research Institute, 1983, n.p., Refs. passim. 41 x 59 cm.

The folio was compiled from data obtained from a radio echo sounding program that spanned ten years of fieldwork and enlisted the joint efforts of Denmark, the United Kingdom, and the United States. Color coded and set to various scales, the folio includes maps showing: Surface of the antarctic ice sheet, compiled by D.J. Drewry; Bedrock surface of Antarctica, compiled by D.J. Drewry and S.R. Jordan; Antarctic ice sheet thickness and volume, compiled by D.J. Drewry; Driving stresses in the antarctic ice sheet, compiled by N.F. McIntyre and A.P.R. Cooper; Isostatically adjusted bedrock surface of Antarctica, compiled by D.J. Drewry; Residual magnetic field in West Antarctica, compiled by E.J. Jankowski; Depth to magnetic basement in West Antarctica, compiled by E.J. Jankowski; and Internal layering in the antarctic ice sheet, compiled by D.H.M. Millar.

F-28970
Krass, M.S., **Model of ice sheet evolution** [Model' evoliutsii lednikovykh pokrovov], *Antarktika; doklady komissii,* 1982 No.21, p.48-57, In Russian. 15 refs.

A simple mathematical model shows the dependence of the mechanics of evolution of massive ice sheets on climatological and geothermal influences. It is observed that the latter play a particularly important role in the mechanics of deterioration: the increase of geothermal currents leads to a sharp increase in the speed of the ice flow. Thus, the flow of ice sheets indicates the areas of relatively recent tectonic activity. This agrees with the existing data showing that most flowing ice sheets in eastern Antarctica relate to ruptures in the Earth's crust. The model is used to determine characteristics of the Quaternary glaciation of Europe, and to estimate the primary stages of massive glaciations.

F-28971
Moskalevskiĭ, M.IU., **Recent glacier moraines on King George and Nelson Islands in the South Shetland Islands** [Sovremennye moreny lednikov ostrovov King-Dzhordzh (Vaterloo) i Nel'son (Leĭptsig), IUzhnye Shetlandskie ostrova], *Antarktika; doklady komissii,* 1982 No.21, p.58-62, In Russian. 3 refs.

Recent moraines, studied on the ice-covered islands of Nelson and King George, are found to be marginal ablation formations and to present a common structural pattern. At depths of 0.2-0.3 m they consist as a rule of coarse-grained material; they are enriched by fine grains at 0.2-0.3 to 0.4-1 m; an ice core is found from 0.4 to 1 m. Studies of glacier termini confirmed a relationship between marginal moraines, deep glacier cracks, and ground moraines.

F-29043
State University of New York at Buffalo. Ice Storage Facility and Information Exchange, **Ice core samples from Greenland and Antarctica,** October 1983, 49p.

The function of the storage facility is explained and a summary of available core material is given. A series of five exhibits shows: deep core drilling accomplished in Greenland and Antarctica; active or completed ice core studies; ice core researchers and types of studies 1975-1983; graphic summaries of ice core availability; and an ice core sample request form. Administrative procedures for using the facility and obtaining core samples are explained and responsibilities of core recipients are outlined.

F-29048
Meier, S., **Portrait of an antarctic outlet glacier,** *Hydrological sciences journal,* Sept. 1983 28(3), p.403-416, With French summary. 11 refs.

The Hays Glacier of Enderby Land is a small Antarctic outlet glacier with a "sack-shape" source region of as yet not exactly known southward extent and area (approximately 10,000 sq km). It has a uniform or slightly wavy longitudinal profile, an approximately 7 km wide calving front between 46 deg 15 min and 46 deg 20 min E, and a partly floating glacier tongue, extending to the seasonally changing front. The longitudinal mean surface slopes are 5-8 m/km on the tongue, 20-30 m/km in the step-shaped central section, and 8-12 m/km in the entrance region. The glacier is bordered to 15 km south of the front by about 500-m-wide serac belts, associated in some places with pressure ridges. The average flow direction of the glacier is north, changing to northnorthwest at the front. The outflow velocity is of the order of 1,000 m/a, and the annual iceberg production in Spooner Bay (the southeastern section of Alasheyev Bight in the Cosmonaut Sea) is approximately 3 cu km. The dynamic conditions along the glacier are inferred from geodetic, strain, and accumulation measurements, and using a modeled internal temperature distribution. (Auth. mod.)

F-29051
Avsiuk, G.A., Kotliakov, V.M., **Main results and prospects of international cooperation in the field of glaciology (for the anniversary of the International Geophysical Year)** [Glavnye itogi i perspektivy mezhdunarodnogo sotrudnichestva v oblasti gliatsiologii (k iubileiu Mezhdunarodnogo geofizicheskogo goda)], *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia,* May-June 1983 No.3, p.5-13, In Russian.

The history of glaciological investigations in the International Polar Year and the International Geophysical Year is reviewed, and the present state of glaciological research and prospects, the interrelationship of glaciation and climate, the study of snow and ice resources, the sounding methods and glaciological engineering problems are examined. The importance of international cooperation is emphasized.

F-29052
Zotikov, I.A., **Melting and freezing under shelf glaciers and their consequences** [Taianie-namerzanie pod shel'fovymi lednikami i ego sledstviia], *Akademiia nauk SSSR. Izvestiia. Seriia geograficheskaia,* May-June 1983 No.3, p.24-33, In Russian. 14 refs.

On the basis of his own investigations and observations in Antarctica the author describes the processes taking place at the bottom surface of shelf glaciers, in terms of temperature distribution, salinity and temperature of sea water in the vicinity of the thawing surfaces. He discusses his findings from the point of view of the shelf glaciers' dynamics and their expected response to possible global changes of climate.

F-29075

Aver'ianov, V.G., **Energy balance of the antarctic ice sheet/atmosphere system as an index of antarctic glaciation,** *Journal of glaciology,* 1983 29(102), p.240-249, In English with French and German summaries. 16 refs.

Mean multi-year values of the components of external mass and energy exchange in the ice sheet, moisture, radiation, and heat balances in the system Antarctic ice sheet/atmosphere have been estimated by various methods. The major features of these balances have been determined as absolute and relative values. For the moisture balance, income of advective moisture is equal to 100%; loss due to accumulation of moisture in the ice sheet is 83%, due to sink into the atmosphere is 15%, and sink from the ice sheet surface is 2%. Income due to radiation at the top of the atmosphere and absorbed by the atmosphere long-wave radiation are 57% and 43%, respectively; loss due to reflected short-wave radiation is 35%, atmospheric long-wave radiation is 78%, and net outgoing radiation from the surface is 9%. Heat budget components have been found as follows: income due to absorbed short-wave radiation is 49%, advection of heat is 40%, and latent heat from phase transition of advective moisture is 11%; loss due to outgoing long-wave radiation is 98%, heat from phase transition of atmospheric moisture is 2%. The Antarctic ice sheet is a vast area of heat sink. Constant negative surface radiation balance and low temperature of the ice sheet suggest that the latter will exist at any small amount of precipitation and, therefore, current glaciation of Antarctica is rather stable. (Auth.)

F-29076

Stockton, W.L., **Submarine ice cliffs on the west side of McMurdo Sound, Antarctica,** *Journal of glaciology,* 1983 29(102), p.272-282, In English with French and German summaries. 14 refs.

Eight submarine ice cliffs have been observed on the west side of McMurdo Sound. Three of these cliffs (Miers Valley, Cape Chocolate, and Strand Moraines) are associated with known ice-cored moraines and are justifiably regarded as underwater exposures of ice cores in the adjacent coast. The ice cliffs at Explorers Cove and near Herbertson Glacier may also be underwater exposures of ice cores which may be present in adjacent moraines. Some of these ice cliffs may represent unusual submarine accretionary sea-ice structures. (Auth.)

F-29077

Pickard, J., **Surface lowering of ice-cored moraine by wandering lakes,** *Journal of glaciology,* 1983 29(102), p.338-342, In English with French and German summaries. 12 refs.

Lake wander is described as a new mechanism for surface lowering of ice-cored moraines. Evidence is provided from Flanders Moraine, Vestfold Hills, Antarctica. Lakes wander when steep ice scarps retreat due to collapse and melt. Rates of wander are *c.* 1.3 m/yr. Rates of lowering due to lake wander on Flanders Moraine are *c.* 0.05 m/yr, which is comparable to rates from elsewhere attributed to different processes. (Auth.)

F-29080

Zakrzewski, W., **Sea ice** [Lody na morzach], Gdańsk, Wydawnictwo Morskie, 1982, 313p., In Polish. 144 refs.

The six chapters of this book review the physical properties of sea ice, the observation of its behavior on the seas, its formation, its dynamics, its distribution in the oceans and seas of the world, and icebergs, respectively. Chapter five deals with the seas surrounding Antarctica, the cycle of ice formation, its shape and consistency, and the occurrence of polynyas and pack ice in the Antarctic. The last chapter discusses the origin, formation and dimensions of icebergs in general, and in the Southern Hemisphere in particular.

F-29098

Paterson, W.S.B., **Deformation within polar ice sheets: an analysis of the Byrd Station and Camp Century borehole-tilting measurements,** *Cold regions science and technology,* Oct. 1983 8(2), p.165-179, 71 refs.

Analysis of the inclinometer surveys of the boreholes at Byrd Station, Antarctica, and Camp Century, Greenland, yields the following results. The measured strain rates at both stations, in ice deposited in the last (Wisconsin) glaciation, reduced to a standard temperature and shear stress, are only about one-third those in the Holocene ice, even though the Wisconsin ice has a strong single-maximum fabric. Variations in strain rate in the Wisconsin ice at Byrd Station are negatively correlated with the number of volcanic dust bands in the ice. It is inferred that the ice below 1800 m at Byrd Station, which has a multiple-maximum fabric, deforms much less readily than the remainder of the ice. A flow model of Nye, with index $n=3$, provides a relation between shear strain rate and shear stress that fits the data from both stations satisfactorily, even though the assumption of plane strain is not strictly valid at Byrd Station. A value of flow parameter A fifteen to twenty times that given by recent data compilations and predicted by dislocation theory, has to be used for the Holocene ice. These data cover a stress range (20-45 kPa) lower than in any other field experiment. (Auth.)

F-29104

Thyssen, F., Shabtaie, S., **Execution and evaluation of large-scale geoelectric soundings near Dome C, East Antarctica** [Durchführung und Auswertung geoelektrischer Messungen grosser Auslage bei Dome C, Ostantarktis], *Polarforschung,* 1983 53(1), p.1-10, In German with English summary. 17 refs.

The resistivity of polar ice at -20 C is in a good approximation 67K omega m with an activation energy of nearly 0.25 eV. At melting temperature polar ice becomes highly resistive. The high resistivity in the basal layer reduces the accuracy in temperature evaluation from geoelectric measurements in polar ice. However, temperature differences of some degrees centigrade over a considerable part of the ice at mean depths can be identified. No electric anisotropy could be found between E-W and N-S direction at Dome C. (Auth.)

F-29107

Retamal, E., **Some experimental results on snow compaction,** International Conference on Permafrost, 4th, Fairbanks, Alaska, July 17-22, 1983. Proceedings, Washington, D.C., National Academy Press, 1983, p.1054-1059, 2 refs.

This paper presents the results of snow field compaction at snow temperatures near 0 C and some stress-strain properties obtained from rigid plate load and unconfined compression tests. The data and results of some load tests performed on the Collins glacier, King George Island, are also presented.

F-29112

Shibuya, K., Tanaka, Y., **Aeromagnetic survey over the Shirase Glacier,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.1-17, 16 refs.

The first aeromagnetic survey over the Shirase Glacier was made in 1980 by the 21st Japanese Antarctic Research Expedition. Total force data were acquired in a digital form and reduced to the magnetic anomaly by correcting International Geomagnetic Reference Field and diurnal variations. The obtained anomaly profiles are characterized by low values corresponding to the topographically low area and high values on both sides of the coast in the range from -100 to +300 nT. In order to interpret the obtained anomalies, two-dimensional modeling of subglacial topography was made. The obtained model has a trough of 1800-2000 m depth with 15-20 km width, extending from north to south. Characteristic features of the model topography are consistent with the subglacial topography estimated by ice-radar and with sea bottom topography obtained by the echo sounder in the neighboring regions. The magnetic susceptibilities of the rock samples from the eastern regions of the Shirase Glacier were measured in this study. The constraints of the ground data on the two-dimensional modeling are discussed. (Auth. mod.)

F-29128

Yoshida, Y., ed, **Geomorphic nature of some unconsolidated deposits in the Langhovde and Skarvsnes areas, Soya Coast, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.231-239, 13 refs.

Some characteristic features of fluvioglacial deposits and a glacial drift in the coastal ice-free areas in the Lützow-Holm Bay area are described and discussed on the basis of the data obtained by field survey in 1981. Two types of fluvioglacial deposits in the Langhovde area indicate that the ice sheet would have receded from the area, leaving small ice masses in small rock basins, and that the flood plain type deposits were deposited during the last 6000 years, considerably later than the former event. A glacial drift found in a part of the Skarvsnes area is notably thick in comparison with those in other areas and is thought to have been deposited by the ice sheet as lodgement till on the basis of its depositional facies. The lodgement till and plastically scoured surfaces of bedrock show that the erosion and deposition by the wet-based ice sheet took place in this region during the last expansion of the ice sheet. (Auth.)

F-29131

Shibuya, K., Ito, K., **On the flow velocity of the ice sheet along the traverse route from Showa to Mizuho Stations, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.260-276, 10 refs.

JARE-21, 1979-1981 made several explosion seismic experiments by installing seismic stations along the S-H-Z route from Showa to Mizuho Stations, on which JARE-14 (1972-1974) had made the traverse survey. Most of the seismic stations were located near the traverse stations, so that the position of each traverse station could be determined from that of a nearby seismic station determined by the NNSS positioning. By comparing the 1973 and 1980 positions of selected traverse stations, the flow velocity of the ice sheet along the S-H-Z route was estimated. Since the method of positioning and the referred geodetic coordinates by JARE-21 were not identical with those by JARE-14, several assumptions were made in the data reduction procedure and in the estimate of the flow velocity. Topographical features of the obtained flow velocity are discussed in view of the comparison with previously obtained flow velocity, the flow lines deduced from the surface topography, the strain field measured near the route and the free-air gravity anomalies over the Mizuho Plateau. (Auth. mod.)

F-29132

Hashimoto, M., Wakahama, G., **Model studies on the formation of inner moraines in the ablation areas of glaciers,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.277-289, 19 refs.

Formation mechanism of inner moraines was studied in a cold laboratory near 0 C by simulation of compressing ice flow near the terminus of glaciers. For this study an apparatus was made to visualize the process of incorporation of sands into the ice mass in conjunction with two-dimensional ice flow. The results indicate the following: When a stagnant ice zone exists near the terminus, the sands are incorporated into the ice mass in the upstream side of the zone by shear action. If an obstacle exists on the bottom at this side and regelation takes place on the downstream side of the obstacle, the sands are incorporated into the ice mass immediately on the top of the regelation ice and further move obliquely upward along the flow line to the upper surface of the glacier. (Auth.)

F-29166

Mart, L., Gravenhorst, G., **Firn sampling for heavy metals** [Probennahme von Firn zur Untersuchung auf Schwermetalle], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.33-35, 3 refs., In German.

The goals of this portion of the summer program were to determine: heavy metal content of Atka Bay snow cover; the influence of sea spray; seasonal and long term factors; whether Atka Bay would be among the uncontaminated antarctic areas even without considering Georg von Neumayer Station; the heavy metal load put into the environment by the Station; distant transport of heavy metals; and the presence of heavy metals in the Station drinking water. These topics are examined and discussed.

F-29169

Jessberger, H.L., Bässler, K.-H., **Report of the glacial engineering group on its work during the 1982/83 expedition at Georg von Neumayer Station** [Bericht der Gruppe "Ingenieurglaziologie" über die Arbeiten während der Expedition 1982/83 an der Georg-von-Neumayer-Station], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.49-66, 7 refs., In German.

The group reported on the status of the facilities from the viewpoint of how much deformation had taken place at the station and on the ice shelf. There was special concern for the condition of the shafts and how much they had been deformed by the snow in two years. Numerous diagrams and photographs which accompany the text show where and how much deformation has occurred.

F-29186

Savel'ev, B.A., **Thermal properties and the mechanics of natural ice** [Termika i mekhanika prirodnykh l'dov], Moscow, Nauka, 1983, 223p., In Russian with English table of contents enclosed. Refs. p.210-222.

Basic factors forming the energy regime, microclimatic, dynamic and kinematic processes of natural ice are analyzed. The processes resulting in transformations of thermal and mechanical properties of sedimentary, metamorphic and congelation ice are discussed. The effect of metamorphism energy on temperature regime of Antarctic ice cover, the specific temperature conditions of elastic, plastic and viscous ice properties, and their relation to phase and salinity composition, and structural peculiarities of the tested ice, are shown for the first time. A new relation is established between sea ice deformation under loads and the mean-integral values of temperature and salinity in different annual seasons, also the dependence of ice properties on the nature of loading, as revealed in three deformation stages.

F-29201

Thomas, R.H., Thompson, D.E., Bindschadler, R.A., MacAyeal, D.R., **Ice-sheet melting and sea level,** Symposium on Coastal and Ocean Management, 3rd, 1983, San Diego, Calif. Proceedings. Edited by O.T. Magoon and H. Converse, New York, American Society of Civil Engineers, 1983, p.2846-2857, 15 refs.

The major potential for sea-level rise during periods of climatic warming is by melting of polar ice. At present, there is considerable summer melting from parts of the Greenland ice sheet, and this would increase under warmer conditions. However, there is little surface melting in Antarctica, and anticipated climatic warming would cause melting only in low-lying areas. Nevertheless, this may weaken the large, floating ice shelves into which flows most of the ice draining from Antarctica. A probable result would be significantly increased ice-drainage rates and more Antarctic icebergs. Portions of the ice sheet that rest on continental shelf could become unstable and collapse. If this happens, sea-level increase would be slow at first but would accelerate rapidly once the collapse became irreversible. (Auth.)

F-29210

Jezek, K.C., **Recent changes in the dynamic condition of the Ross Ice Shelf, Antarctica,** *Journal of geophysical research,* Jan. 10, 1984 89(B1), p.409-416, 9 refs.

Variations in the amplitude of radar echoes from the bottom of the grid western half of the Ross Ice Shelf have been analyzed. Contrary to the results of a similar analysis performed for the grid eastern sector of the ice shelf, bands of low signal strength downstream from both Crary Ice Rise and the Siple Coast do not correlate with modern flow lines. The difference in direction between the radar bands downstream of Crary Ice Rise and the present velocity vectors and the absence of of a comparable trend farther east suggest to us that the grounding line around Crary Ice Rise retreated within the last 1000 years. This hypothesis is reinforced by the observation of several domes and hollows in ice thickness downstream of Crary Ice Rise which are similar to a hollow now located in the wake of the ice rise and a dome of its eastern flank. We interpret this as evidence for a rapid increase in flow around the ice rise which carried downstream the ice topography formed around the ice rise. Similar but less detailed evidence found downstream of the Siple Coast suggests that there was a regional retreat of the West Antarctic grounding line. (Auth.)

F-29218

Nishio, F., **What exciting things are involved in the antarctic ice sheet,** *Polar news,* Aug. 1983 No.37, p.2-6, In Japanese.

To measure the horizontal and vertical movements and strain rates of the ice sheet surface in the Mizuho Plateau, the JARE carried out a triangulation survey on the network, which traverses flow lines most of which converge into the Shirase Glacier. Using the vertical movement, the rate of change of ice thickness, by excluding the effect of the firn densification, is about -70 cm/yr in the Mizuho Plateau. The thinning rate is too large to be compensated for by the present accumulation rate nor can temporal variations of the accumulation rate account for such a large thinning rate. Considering possible causes of the thinning, using the equation of mass continuity along the flow line, we conclude that the horizontal velocity at the base is significantly large and the thinning of the ice sheet may be predominantly caused by basal sliding. Basal sliding might be taking place in the ice sheet which has large surface velocity under an assumption that the base of the ice sheet is at the melting point. If the basal ice is at the melting point and basal sliding is occurring in the northern part of the Shirase Glacier drainage basin, the base is wet. This may be a reason for the rapid motion of the Shirase Glacier, surface velocity about 2.2km/yr, as if it were surging. (Auth.)

F-29232

Comiso, J.C., Ackley, S.F., Gordon, A.L., **Antarctic sea ice microwave signatures and their correlation with *in situ* ice observations,** *Journal of geophysical research,* MP 1668, Jan. 20, 1984 89(C1), p.662-672, 24 refs.

The general characteristics and microwave radiative properties of sea ice in the Weddell Sea region during the onset of spring are studied by using the NIMBUS 7 Scanning Multichannel Microwave Radiometer (SMMR) and other satellite sensors in conjunction with *in situ* observations. The position of the ice edge, the gradient of ice concentration, and the width of the Marginal Ice Zone are inferred from the microwave data and are found to be consistent with ship observations especially at 18 GHz. The sensitivities of the various SMMR frequencies to surface and other effects are investigated by using multi-spectral cluster analysis. The results show considerable variability in emissivity, especially at 37 GHz, likely associated with varying degrees of surface wetness. Ice concentrations are derived by using two methods: one that assumes fixed emissivities for consolidated ice and an iterative procedure that accounts for the variable emissivities observed. Use of the procedure that allows the emissivities to be variable gives ice concentrations that are more consistent with qualitative field observations. (Auth.)

F-29233

Azuma, N., Higashi, A., **Effects of hydrostatic pressure on the rate of grain growth in Antarctic polycrystalline ice,** *Journal of physical chemistry,* Oct. 13, 1983 87(21), p.4060-4064, 12 refs.

In view of the importance of the growth of recrystallized grains for clarifying the mechanism of the depth variation of the ice fabric near the bottom of the ice sheet, experiments on the normal grain growth of ice were carried out under a hydrostatic pressure of up to 50 MPa. Specimens prepared from both an Antarctic deep ice core and artificially grown polycrystalline ice were observed in a high-pressure tank. Growth processes were analyzed from intermittently taken photographs. The activation energy for the grain growth was obtained from the temperature dependence of the rate constant K and it was 0.7-0.8 eV over the low-temperature range. The pressure dependence of K gives the activation volume of grain growth. Implications for the large values of the activation energy and the activation volume in grain growth compared to those for self-diffusion in bulk ice are discussed. (Auth.)

F-29234

Hammer, C.U., **Initial direct current in the buildup of space charges and the acidity of ice cores,** *Journal of physical chemistry,* Oct. 13, 1983 87(21), p.4099-4103, 15 refs.

The relation between the initial direct current in the buildup of space charges, between moving electrodes applied on a clean ice core surface, and the acidity of the core is discussed. Results from the antarctic Byrd core and the greenland Dye 3 core are given to illustrate the range of the method. Special emphasis is given to the range and potentiality of the method. (Auth.)

F-29236

Ocampo, J., Klinger, J., **Proton mobility in the bulk and the surface of hexagonal ice,** *Journal of physical chemistry,* Oct. 13, 1983 87(21), p.4325-4328, 15 refs.

Proton nuclear magnetic resonance spectra were recorded for different ice samples having high surface-to-volume ratios and for ice from deep Antarctic cores. After ageing at different annealing temperatures the line widths, relative chemical shifts, and intensities were measured. The antarctic samples show a broad and a narrow component. The highly mobile phase develops after one annealing cycle and its mobility increases thereafter with time. Ice-silica mixtures show a narrow component and a greater mobility that increases after an annealing cycle in an irreversible manner. The aging effect seems to be accompanied by distortion of the water molecules at the interfaces. A process of rearrangement of the ice crystal lattice associated with the mobile phase is suspected. (Auth.)

F-29266

Kikuchi, T., **Heat flux in surface snow at Mizuho Station, Antarctica: monthly values and errors,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.61-69, 10 refs.

Investigations are made on the determination of conductive snow heat flux at Mizuho Station, from the end of February to December 1979 during the first year of POLEX-South. Some preliminary analyses on the heat flux meter outputs raised questions on the data. As an alternative method, numerical differentiation and integration method is used to calculate snow heat flux from snow temperature. Errors accompanying the calculation are investigated, and it is found that this method gives monthly heat flux with a relative error of about 10%. Snow temperature gradient in the surface layer is consistent with the present estimates. Estimated snow heat flux is compared with the results obtained at other sites in Antarctica. (Auth.)

F-29271

Satow, K., **Observations on the shapes of snow crystals in the summer season in Mizuho Plateau, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.103-109, 10 refs.

The shapes of single bullet and combination of bullets were frequently observed, and because of their large mass, these crystals are considered to be the major contributor to the snow accumulation in the Mizuho Plateau area. Long solid column crystals were found within the surface air temperature range from -42 C to -56 C, when the air temperature at the inversion top was from -38 C to -43 C. The mean length of c-axis of these crystals was 287 microns and the maximum length was 1.2 mm. The mean value of the axial ratio *(c/a)* of the crystals was 18 and the maximum value was 70. Only a few scalene hexagonal, triangular and square form crystals were detected inland. (Auth.)

F-29272

Gonda, T., **Morphology of ice crystals growing in free fall at the temperatures between -40 and -140C,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.110-120, 10 refs.

For the sake of studying the morphology and the growth mode of single snow crystals forming in the polar regions, ice crystals have been grown in free fall at the temperatures between -40 and -140 C and their morphology and growth mode have been studied. As a result, in the temperature range from -40 to -70 C, which seem to arise in the polar regions, single ice crystals are predominantly formed at about -40 C, but below about -50 C polycrystalline ice crystals are predominantly formed. The growth mode of column-like ice crystals growing at -50 C is nearly in agreement with that of diamond dust type ice crystals observed in Antarctica. (Auth. mod.)

F-29274

Higashi, A., Nakawo, M., Enomoto, H., **Bubble close-off density of ice in antarctic ice sheets,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.135-148, 17 refs.

Measuring methods of the density and the total gas content in ice cores were developed considering various sources of systematic errors. Special attention was given to the method of correction for the effect of surface-exposed air bubbles. True density and the total gas content were obtained for ice cores drilled at three sites (S 48, H 231 and Z 102.5) of different altitudes in the Showa drainage basin and the Shirase drainage basin, East Antarctica. The bubble close-off densities exhibit their increasing tendency with increasing elevation of the sites of close-off. The relationship between the reduced void ratio and the temperature both at the close-off, exhibits a little higher level with almost the same gradient than the result obtained by earlier researchers. (Auth. mod.)

F-29275

Nishimura, H., Maeno, N., Satow, K., **Initial stage of densification of snow in Mizuho Plateau, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.149-158, 22 refs.

The initial stage of densification of snow was investigated for four 30-m snow cores drilled in Mizuho Plateau, with special reference to the critical density of 550 kg/cu m and to compactive viscosity. The density-depth relations were considerably different among the four cores, but the depth of the density 550 kg/cu m was noted to increase with the distance from the coast. The result could be explained by a physical dependence of snow densification on temperature and accumulation rate. The compactive viscosity coefficient, calculated from the density-pressure curves is expressed by an equation. A densification model was constructed to estimate the pressure or depth at which the critical density 550 kg/cu m is reached, as a function of temperature and accumulation rate. The model in turn makes it possible to estimate the annual accumulation rate at any observation site from the depth at which the density reaches 550 kg/cu m and the mean annual temperature given by the 10-m depth temperature. (Auth.)

F-29276

Ishida, T., Maeno, N., **Power spectral analysis of snow densities at Mizuho Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.159-165, 15 refs.

Power spectrum analyses were made of layer-to-layer variations of densities of core-samples recovered by drilling at Mizuho Station, Antarctica. The power spectra computed by the maximum entropy method shows twenty-seven cyclic changes of snow deposition mode and consequently of climatic circumstances. The periods of the climatic changes are estimated to range from 6.1 to 389.4 years. (Auth.)

F-29277

Fujii, Y., **Past 30-year pH record in a firn core from the Brunt Ice Shelf, Antarctica, and its relationship to volcanic events,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.176-184, 19 refs.

A pH profile along a well-dated firn core from the Brunt Ice Shelf near Halley Base was obtained spanning the years from 1951/1952 to 1982. Especial emphasis is paid to the summer decrease in the seasonal variation and to the low pH values in some summers between 1955/1956 and 1970/1971, and in 1980/1981. Comparison with Lamb's volcanic dust veil indices up to 1968 and to major volcanic events after 1969 suggests that the significant decrease of pH in some summers is linked to major volcanic eruptions in the equatorial zone and to major and even minor ones in the Southern Hemisphere. (Auth.)

F-29310

Ferrigno, J.G., Williams, R.S., Jr., **Limitations in the use of Landsat images for mapping and other purposes in snow- and ice-covered regions: Antarctica, Iceland, and Cape Cod, Massachusetts,** International Symposium on Remote Sensing of Environment, 17th, Ann Arbor, MI, May 9-13, 1983. Proceedings, Ann Arbor, Environmental Research Institute of Michigan, 1983, p.335-355, Refs. p.352-355.

Serious design limitations within the return beam vidicon (RBV) system have severely affected the acquisition of good quality imagery for areas having highly reflective terrain, especially those covered with snow and ice. In the 5 years of Landsat 3 operation, approximately 3,230 subscenes were acquired of the Antarctic continent. Only a very small percentage of these RBV images are of sufficient quality for map conpilation or revision. A certain loss of information is also apparent on Landsat multispectral scanner (MSS) images of Antarctica, although not as much as on the RBV images. Results and quality are described of Landsat 3 RBV images which were used to map the perimeter of the Vatnajökull ice cap in southeastern Iceland and snow-covered Cape Cod, Massachusetts. To achieve optimum images of perennially or seasonally snow- and ice-covered polar and temperate areas, future remote sensors must be designed to handle the wide variation in reflectivity of this terrain. (Auth. mod.)

F-29317

Fukuda, A., Ogawa, Y., Nakawo, M., **Misalignment of crystal axis of subgrains in Antarctic sea ice,** *Seppyo,* Dec. 1983 45(4), p.169-176, In Japanese with English summary. 11 refs.

Crystal axes of minute subgrains in sea ice grown near Showa Station, Antarctica were examined by X-ray Laue photographs. Subgrains which usually can not be distinguished by polarized light are bounded by subboundaries accompanied with brine pockets in a crystal grain of the polycrystals of sea ice. The misalignment angles of the crystal axes between adjacent subgrains were deduced. Samples from 0.10 m and 0.17 m depths from the surface had misalignment angles ranging from 0 to 10 degrees or more. Those from 1.1 m and 1.5 m depths had angles less than 7 degrees, and most of them were 0 degree. The average values of the misalignment angles were 7 and 3 degrees with the samples from 0.10 m and 0.17 m depths respectively, and 1 and 1.7 degrees with those from 1.1 m and 1.5 m depths respectively. Subgrains are formed from cellular growth of ice into the constitutionally supercooled sea water. The misalignment between adjacent subgrains could be caused by some disturbances associated with the growth of subgrains; intrinsically the thermal expansion force and extrinsically the effects of wave and underwater current. The misalignment angle decreases with increase of the depth of sea ice partly because of the decrease of disturbances with increasing depth. (Auth. mod.)

F-29361

Denton, G.H., Hughes, T.J., **Milankovitch theory of ice ages: hypothesis of ice-sheet linkage between regional insolation and global climate,** *Quaternary research,* Sep. 1983 20(2), p.125-144, Refs. p.141-144.

It is proposed that interlocked variations of ice-sheet heat sinks in both polar hemispheres amplified and transmitted Milankovitch summer half-year insolation changes between 45 and 75 N into the globally synchronous climate changes recorded in geologic records. It is suggested that late Quaternary ice sheets had terrestrial components and marine components. Northern Hemisphere ice sheets were largely marine in the Arctic and terrestrial in the midlatitudes. West Antarctic and peripheral East Antarctic ice was marine-based and lacked melting margins. Because of their geographic array, these terrestrial and marine components formed an ice-sheet system whose variations were coupled on a global scale. Milankovitch summer insolation changes near midlatitude Northern Hemisphere melting margins controlled most variations of this system, because advance or retreat of melting margins initiated concurrent eustatic sea-level change. Such sea-level change afforded the critical interlocking mechanism between terrestrial and marine components. By analogy with present-day Antarctica, late Quaternary ice sheets were enormous planetary heat sinks due to their reflective and radiative surface characteristics. It is suggested that the effectiveness of these ice-sheet heat sinks varied with their areal extent and interior surface elevation. Thus, it is postulated that concurrent growth or decay of these interlocked ice-sheet heat sinks in both polar hemispheres served as the global amplifier of regional Milankovitch summer insolation. (Auth. mod.)

F-29365

Delmas, R.J., Aristarain, A., Legrand, M., **Acidity of antarctic snow: a natural reference level for acid rains,** International Conference on the Ecological Impact of Acid Precipitation, Sandefjord, Norway, March 11-14, 1980. [Proceedings], edited by D. Drablös and A. Tollan, Oslo, Oct. 1980, p.104-105, 8 refs.

Several hundred Antarctic snow and ice samples have been measured for strong acidity/alkalinity. All samples have been found acid, with H+ concentrations ranging generally between 1 and 5 mu Eq/l. At Dome C, the overall mean value of the last 20 yr is 3.4 mu Eq/l and at South Pole, 3.9 mu Eq/l. No definite trend resulting from the increasing industrial pollution has been detected at either station. Past and present polar precipitation are acidic, because of the presence in the local atmospheric aerosol of gas-derived natural acids. The pH of the meltwaters of such snow or ice is calculated to be in the range 5.2-5.5. Stratospheric volcanic sulfate contributes significantly to the acidity of the polar precipitation.

F-29417

Kotliakov, V.M., Gordienko, F.G., Barkov, N.I., Korotkevich, E.S., **Isotopic core investigations from Vostok Station and their paleoglaciological interpretation** [Izotopnye issledovaniia kerna so stantsii Vostok i ikh paleogliatsiologicheskaia interpretatsiia], *Antarktika; doklady komissii,* 1980 No.19, p.45-53, In Russian. 25 refs.

Oxygen isotope measurements of antarctic ice cores up to 950 m deep at Vostok Station are analyzed. For paleoclimatic reconstruction Vostok Station is much more favorable than Byrd Station, western Antarctica, or Camp Century, Greenland, where ice was drilled down to the bedrock. Accounting for corrections for the paleodynamics and age of the ice cover in the Vostok Station area, it is shown that delta-0-18 isotope data reached their present values 10,000 y.a. The culmination of the late Wisconsin occurs 15 to 29 thousand y.a. with a short interval around 17 th.y.a. The period between 29 and 52 th.y.a. is characterized by a generally cold background temperature, with little variation, which, in relation to today's temperature, was 4 to 5 deg. lower. 52 to 63 th.y.a. the temperature was even lower than that by 1 deg. On the basis of ice analysis of West Antarctica, it is concluded that in the era representing Wisconsin the climate there was somewhat warmer than today, possibly by 2 to 3 deg.

F-29420

Shumskiĭ, P.A., Miagkov, S.M., **Evolution of McMurdo Sound mountain glaciers during the last million years and its causes** [Evoliutsiia gornykh lednikov oazisa Mak-Merdo v posledniĭ million let i ee prichiny], *Antarktika; doklady komissii,* 1980 No.19, p.89-100, In Russian. 18 refs.

History and development of McMurdo Sound glaciation, with dating of basic phases in the absolute scale of time, is presented. A method for calculating ice temperature and rate of accumulation, from shape and dimension data of a horizontal projection of a stationary glacier, is proposed. Based on studies of ancient moraines of Meserve Glacier, variations of air temperature and amount of atmospheric precipitation in McMurdo Sound during the last million years are calculated.

F-29421

Miagkov, S.M., **Periodization principles of antarctic glaciation history** [Osnovy periodizatsii istorii oledeneniia Antarktidy], *Antarktika; doklady komissii,* 1980 No.19, p.101-117, In Russian. Refs. p.115-117.

Principles for age determination of antarctic ice cover, and the cause of its formation, are described. The cooling effects of antarctic glaciation on the earth's climate are calculated, and the sea-level variations of the World Ocean are quantitatively determined. Based on these calculations, the structure of the south polar glaciation, and factors controlling its dimensions, are discussed and an approximate periodization is given which reflects the history of the eastern portion of the antarctic ice cover. Some suggestions for further studies in this area are offered.

F-29422

Barkov, N.I., Gordienko, F.G., **Origin of McMurdo Sound glaciers from oxygen-isotopic ice analysis data** [Proiskhozhdenie lednikov raĭona zaliva Mak-Merdo po dannym kislorodnoizotopnogo analiza l'da], *Antarktika; doklady komissii,* 1980 No.19, p.118-131, In Russian. 29 refs.

Oxygen-isotopic measurements were obtained from ice samples in the McMurdo Sound area to determine the origin of ancient ice and its link with the surrounding glaciers. Findings show that the central part of McMurdo Sound shelf ice, that is the entire glacier area covered by a moraine, has been formed from sea water, while in ice samples originating from atmospheric precipitation a certain amount of sea water is found, which has filtered through the glacier's side wall. Isotopic analyses of moraines with ice cores show that a large moraine field between Hobbs and Blue glaciers, from sea level to heights of 300 m, was deposited not by a land glacier but by a floating glacier of the McMurdo shelf-ice type, formed by sea water, and grounded at a time of a lowering of sea level. Analysis of ice samples taken from Hobbs, Erebus and Wright Valley glaciers shows that they were formed by atmospheric precipitation. It is concluded that this precipitation occurred at low atmospheric temperatures, at higher altitudes or during a general cooling of the climate.

F-29433

Katyal, K.N., Upadhyay, D.S., **Hydrometeorological characteristics of snow and ice over Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.1-17, 4 refs.

This paper deals with hydrometeorological characteristics of snow and ice along with radiation balance and computation of melt rate over the Antarctic continent. Climatic features of the continent were also studied and are presented here. It is observed that a large quantity of solar radiation (0.5-0.7 ly/min) is received at the surface but more than 80% of it is reflected back into space. The net long wave radiation exchange, convective transfer and exchange of sensible heat contribute negatively to the mechanism of snowmelt during the summer months. The net snowmelt computed by various physical processes is found to be a few centimeters per day even in extreme summer period. The maximum wind speed observed during the expedition period was 80 km/hr. Also the typical phenomena of inversion mirage formed on the snow surface were observed during the expedition. (Auth.)

F-29439

Sen Gupta, R., Qasim, S.Z., **Chemical studies on the ice shelf, a fresh water lake and a polynya at Princess Astrid Coast, Dronning Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.62-68, 19 refs.

Chemical properties, measured up to 5 meters of the ice shelf, in the surface waters of a freshwater lake and at several water depths in the polynya, are reported. An increasing vertical gradient downwards in most of the constituents was found in the ice. No significant difference was found in the constituents at some distance away from the shore. Concentrations of most of the elements in the freshwater lake are largely regulated by the melted water coming from the glaciers and surrounding ice, leaching of materials from the rocks and the evaporation caused during the prolonged summer. Concentrations of the heavy metals in the ice and in the lake and in a Himalayan glacier at varying heights were found to be of a similar order. These features indicate that both Antarctica and the high altitudes of the Himalayas have clean and unpolluted environment. Studies of the polynya indicate that the surface layers are influenced by the melting of ice but an oceanic layer exists below 150 m depth. Chemical characteristics of the lower layers are similar to those of the deeper waters of the southern ocean. (Auth.)

F-29450

Vohra, C.P., **Glaciological studies during the First Indian Antarctic Expedition,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.138-148, 6 refs.

A large number of horizontal, tilted and overturned icebergs were observed. Their estimated thicknesses trend from a few meters to over 200 m. Examination of the pack ice and the ice shelf around the base camp indicated the altitude of the latter as 44 m. Experiments using carbon black gave average results of ice melting as 35.8 mm/day (19.7 mm water equivalent). Average natural melting was observed as 2.6 mm/day (1.4 mm w. eqv.). Studies of the ice core samples show the presence of nuclear debris. Cosmogenic Be-7 occurs at levels of 30 dpm/L. Small amounts of dust, obtained by filtering melt water, show presence of metallic spherules. Absence of elements characteristic of meteoritic or cometary debris suggest that most of them are of volcanic or industrial origin. (Auth.)

F-29471

Rapley, C.G., **First observations of the interaction of ocean swell with sea ice using satellite radar altimeter data,** *Nature,* Jan. 1984 307(5947), p.150-152, 17 refs.

The action of ocean waves and swell on sea ice in the marginal ice zone (MIZ) controls the size distribution of ice floes and thus affects ice dynamics and the thermodynamics of ice growth and decay. Previous observations of the propagation of swell within the ice pack have been limited in spatial and temporal extent. In this article, new results from the US Seasat satellite are presented, which suggest that radar altimetry can provide a powerful means of global synoptic monitoring of the interaction between ocean and ice. Four consecutive 3-day maps of antarctic sea ice and regions of ocean swell greater than 5 m are presented, showing greater variability of the ice edge in regions affected by swell. (Auth. mod.)

F-29475

Russell-Head, D.S., Budd, W.F., Moore, P.J., **Compressed snow-ice airstrip construction in Antarctica,** *Melbourne University Programme in Antarctic Studies. MUPAS report,* July 1982 No.52, 65p., 11 refs.

The methods for constructing a compressed snow-ice runway in Antarctica are reviewed. It is possible to construct a pavement suitable for wheeled landings by C-130H aircraft at a site near Casey. The cost of producing a runway is likely to be less than $0.75M and the annual maintenance cost should be less than $60,000. (Auth.)

F-29478

Kerr, R.A., **Ice cap of 30 million years ago detected,** *Science,* Apr. 13, 1984 224(4645), p.141-142, 4 refs.

The oxygen isotopes of marine sediments are providing strong indirect evidence of an antarctic ice cap twice as ancient as the present one. (Auth.)

F-29493

Lorius, C., Raynaud, D., **Record of past atmospheric CO2 from tree-ring and ice core studies,** Carbon dioxide: current views and developments in energy/climate research, edited by W. Bach, A.J. Crane, A.L. Berger, and A. Longhette, Dordrecht, Holland, D. Reidel Publishing Co., 1983, p.159-176, 44 refs.

DLC QC879.8.C372 1983

The available ice core records cover the last 40,000 years. They allow one to estimate the pre-1850 AD atmospheric CO2 concentration and to attempt a description of the atmospheric CO2 loading during the last ice age. Observed CO2 changes are compared with climate and other environmental changes also recorded in ice cores. Possible explanations are suggested for the large CO2 variation observed around the end of the ice age. (Auth.)

F-29494

Oerlemans, J., **Modeling the cryospheric response,** Carbon dioxide: current views and developments in energy/climate research, edited by W. Bach, A.J. Crane, A.L. Berger, and A. Longhette, Dordrecht, Holland, D. Reidel Publishing Co., 1983, p.281-297, 24 refs.

DLC QC879.7.C372 1983

How the cryosphere (ice-sheets, ice shelves and sea ice) may react to a climatic warming is discussed. Concerning the reaction of the Antarctic Ice Sheet to a changing mass balance (i.e. ice accumulation rate at the surface) more specific model experiments are considered, while the possibility of ice-sheet surging is treated in a more schematic way. How changes in cryospheric conditions may in their turn affect the large-scale climate system concludes the discussions. (Auth.)

F-29495

National Research Council. Carbon Dioxide Assessment Committee, **Sea level, Antarctic, and Arctic,** Changing climate: report of the Carbon Dioxide Assessment Committee, Washington, D.C., National Academy Press, 1983, p.40-44. PB84-148576.

DLC QC879.8.N37 1983

Processes capable of producing apparent changes in sea level are reviewed. Two of these, changes in ocean water mass from accumulation or melting of ice sheets and alpine glaciers and thermal expansion or contraction of ocean waters are discussed with reference to arctic and antarctic environments.

F-29496

Revelle, R.R., **Probable future changes in sea level resulting from increased atmospheric carbon dioxide,** Changing climate: report of the Carbon Dioxide Assessment Committee, Washington, D.C., National Academy Press, 1983, p.433-448, PB84-148576, 28 refs.

DLC QC879.7.N37 1983

After giving an estimate of a possible rise in sea level of 70 cm during the next 100 years, it is anticipated that during several centuries afterward a larger rate of rise is not unlikely because of possible events in Antarctica. These events would include the collapse of the West Antarctic Ice Sheet releasing 2 million cu km of ice which would produce a sea level rise of 5 to 6m. Conditions are compared between those of 125,000 years ago and the present; conditions are suggested which would bring about the collapse and the possibilities of these events occurring are assessed.

F-29568

Doake, C.S.M., Dalziel, I.W.D., Crabtree, R.D., **Subglacial morphology between Ellsworth Mountains and Antarctic Peninsula: new data and tectonic significance,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.270-273, 23 refs.

DLC QE350.A57 1983

Bedrock topography derived from airborne radio echo sounding shows an extensive subglacial rift system between the Ellsworth Mountains and the Antarctic Peninsula. Vinson Massif in the Ellsworth Mountains rises to 5140 m above sea level, the highest peak in Antarctica, while only 45 km to the east the Rutford Ice Stream rests on rock 2000 m below sea level. Rutford Ice Stream occupies a depression several hundred kilometers long and up to 30 km wide. Similar bedrock depressions to the northeast are filled by ice from Carlson Inlet and Evans Ice Stream, both reaching more than 1500 m below sea level. Between the ice streams are steep sided blocks with bedrock elevations around 300 m below sea level. Although the ice sheet has undoubtedly caused some erosion, the morphology of the troughs suggests they are grabens, perhaps exhumed and emphasized by glacial action but not created by it. This view is supported by the discordant trough across Fowler Peninsula and the contrast with the subdued topography at the head of the Ross Ice Shelf where there is a similar pattern of ice stream flow. The trenches occupied by the ice streams may be the result of NE-SW crustal extension and, together with the blocks, need to be considered when reconstructing the postulated anticlockwise rotation of the Ellsworth Mountains since the Gondwana breakup. Precambrian rocks at Haag Nunataks suggest that a major boundary exists along the Evans Ice Stream separating the Antarctica Peninsula from the rest of Antarctica. (Auth.)

F-29594

Domack, E.W., Anderson, J.B., **Marine geology of the George V continental margin: combined results of Deep Freeze 79 and the 1911-14 Australasian Expedition,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.402-406, 35 refs.

DLC QE350.A57 1983

During the Australasian Expedition of 1911-14 geological and glaciological reconnaissance studies were conducted along the coast and in the waters of the George V Coast under the direction of Sir Douglas Mawson. Important accomplishments made during this expedition included mapping of the ice front, observations of sediment laden icebergs, bottom sediment descriptions and geologic mapping of coastal outcrops. During the United States Deep Freeze 79 expedition we revisited the George V Coast and conducted a detailed marine geologic survey of the area. Mawson, Ninnis and Mertz's sledging track was retraced by helicopter and a new map of the ice front constructed. This map, combined with that of Mawson's party and a 1957 Russian survey, shows significant historical changes in the size and shape of the Mertz and Ninnis ice tongues. We also encountered a number of sediment laden icebergs, including two icebergs with basal debris zones. The most prominent physiographic feature of the area is the George V Basin, a deep (up to 1300 m) glacial trough oriented subparallel to the coast. Piston cores taken from this depression and elsewhere on the shelf penetrated lodgment till with a mineralogic composition indicative of an easterly source, probably the Cook Ice Shelf. At the present time, terrigenous sediment supply to the continental shelf is minimal. Siliceous mud and ooze is the most widespread surficial deposit. Sediment reworking is most pronounced at the shelf edge and upper slope and results from impinging circumpolar currents. Lower Cretaceous siltstone, containing a rich spore assemblage, identical to that of South Australian deposits of that age, was recovered in one core from the George V Basin. The shallow occurrence of this sediment relative to that of the Australian continental margin, where Lower Cretaceous deposits occur several kilometers subsurface, reflects a very different subsidence and sedimentation history for these two margins. (Auth.)

F-29603

Omoto, K., **Problem and significance of radiocarbon geochronology in Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.450-452, 22 refs.

DLC QE350.A57 1983

Many radiocarbon dates have been used since the 1960s in order to clarify glacial geohistory of Antarctica, even though problems remain with the basic assumptions of the radiocarbon dating method. Sea water samples and living marine organisms in Antarctica have both yielded anomalously old apparent ages up to 2860 yr B.P. This is a serious problem in considering the precise Holocene geochronology of ice free areas of Antarctica, and is due to low radiocarbon concentrations in surface sea water. These are thought to be caused either by the upwelling of 14-C-deficient deep ocean waters of the dilution of surface seawater by fresh water melting from icebergs, ice shelves, and glaciers. The anomalously old apparent ages make it hazardous to correlate between different areas of Antarctica solely on the basis of the coincidence of dates. Such correlations require the establishment of reservoir correction factors. Radiocarbon dating techniques have been improved by geochronologists seeking a superior tool. The remarkable progress made in recent years is characterised by the use of micro-computer systems and accelerator techniques. Using these systems very old dates with small uncertainties are now available up to 75,000 yr BP. (Auth.)

F-29607

Adamson, D., Pickard, J., **Late Quaternary ice movement across the Vestfold Hills, East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.465-469, 13 refs.

DLC QE350.A57 1983

Glacial striations on the Vestfold Hills record at least three phases of ice movement. During the last major advance of the ice sheet (Vestfold Glaciation) the hills were completely covered but Late Pleistocene fossiliferous sediments survived on Marine Plain. During retreat of the ice sheet a localised lateral advance of the Sörsdal Glacier (Chelnok Glaciation) occurred within the last 2000 years, leaving northerly striations superimposed on the regional west northwest set. Other sets of striae follow minor valleys, particularly in the vicinity of Lichen Lake. These three sets are referred to as the Vestfold, Chelnok and minor valley striae respectively. Retreat of ice and emergence of the land above sea level is indicated by widespread geomorphological features and by deposits of Holocene marine and nonmarine fossils which have been extensively radiocarbon dated. For several thousand years the northern margin of the Sörsdal Glacier has been relatively stable with minor oscillations. The continental ice sheet has retreated in pulses but with an average rate of 1-2 km per 1000 years. Geomorphological and sequential airphoto evidence suggests that the northern margin of the Sörsdal Glacier is grounded and presently retreating and that the edge of the ice sheet is still in active retreat. The regional warming caused by the large area of exposed rock, combined with sluggish ice flow towards the Vestfold Hills, accounts for the continued expansion of the ice free area, quite apart from any considerations of global warming. (Auth.)

F-29633

Annexstad, J.O., Schultz, L., **Measurements of the triangulation network at the Allan Hills meteorite icefield,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.617-619, 14 refs.

DLC QE350.A57 1983

In 1978 a triangulation network marked by stakes set into drilled holes was established across the Allan Hills icefield where large concentrations of meteorites have accumulated. The interior angles of the network's 18 constituent triangles were remeasured in 1979 and 1981 and ablation measurements conducted annually from 1979. The results show, within the limits of error, that the Allan Hills icefield moves in an easterly direction. The rate of ablation averages less than 5 cm per year, is not constant from year to year and varies widely from station to station. Although the icefield is limited in extent and exhibits a low flow rate, the discovery of a large number of meteorite fragments found there shows that it has been an efficient collector of specimens. (Auth.)

F-29651

Dubrovin, L.I., **Basic morphology and variations of antarctic ice shores** [Osnovnye cherty morfologii i izmenchivosti ledianykh beregov Antarktidy], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.65-74, In Russian. 10 refs.

The causes, formation, development and changes of antarctic ice shores, which constitute 95% of the antarctic shoreline, are studied from cartographic data and data collected by the Soviet Antarctic Expedition. The distribution and thickness of floating ice sheets are tabulated and the underlying water temperatures are given to a depth of 250 m.

F-29658

Kudriashov, B.B., Chistiakov, V.K., Morev, V.A., **Thermal drilling of antarctic ice cover** [Burenie lednikovogo pokrova Antarktidy teplovym sposobom], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.138-149, In Russian. 21 refs.

Techniques of drilling through the antarctic ice cover and the electrothermal drills used on land between Mirnyy and Vostok Stations, as well as on shelf ice over various seas, during the years 1960-1981 are described.

F-29697

Kohnen, H., **Investigation of the antarctic ice cover** [Erforschung der antarktischen Eisbedeckung], *Geographische Rundschau,* Mar. 1983 35(3), p.104-111, In German. 5 refs.

Various aspects of problems which exist in researching the mass balance, forms and processes of antarctic ice are discussed. Considered are sea ice, shelf ice, ice sheets, glaciers, calving, and ice streams. The special situation with the West Antarctic ice sheet is emphasized. Current ice research projects are also noted and international efforts such as the International Antarctic Glaciological Project, the Ross Ice Shelf Project, and the West Antarctic Ice Sheet Project designed to increase general knowledge of antarctic ice are pointed out. German studies on the Filchner Ice Shelf are also discussed and some preliminary results are given. Included with this item are two inserts dealing with satellite mapping of new Schwabenland.

F-29705
Legrand, M., De Angelis, M., Delmas, R.J., **Ion chromatographic determination of common ions at ultratrace levels in antarctic snow and ice,** *Analytica chimica acta,* Jan. 1, 1984 Vol.156, p.181-192, 12 refs.

The simultaneous determination of major impurities present in Antarctic snow and ice at ng/g (ppb) concentrations by ion chromatography is described. Calibration data are presented for ammonium, sodium, potassium, chloride, nitrate and sulphate ions. Special attention is paid to the different ways of removing field contamination from ice and snow cores and suitable equipment is described. The results provide evidence against the validity of published sets of concentration data for nitrogen-containing compounds in Antarctic snow, and demonstrate a crucial contamination problem in the determination of ammonium ions. (Auth.)

F-29725
Kristensen, M., **Iceberg calving and deterioration in Antarctica,** *Progress in physical geography,* Sep. 1983 7(3), p.313-328, Refs. 325-328.

Five different mechanisms of iceberg calving, principally from ice shelves, are described, as are their shapes and their characteristics, such as density structure and the temperature profiles. Calculations of tabular iceberg drifts and breakup are presented.

F-29728
Gordienko, F.G., Korolev, P.A., Kotliakov, V.M., Diurgerov, M.B., **Glaciological studies on the traverse to Dome C** [Glatsiologicheskie issledovaniia na marshrute k kupolu C], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.17-26, In Russian. 9 refs.

Traverse operations in eastern Antarctica included measuring the altitude of the ice cover surface at different points and the thickness and compactness, of the year's layer of snow. Results of oxygen-isotopic determinations are tabulated.

F-29729
Zotikov, I.A., Zagorodnov, V.S., Raĭkovskiĭ, IU.V., **Ultrasound investigations of Ross Ice Shelf bottom** [Issledovanie nizhneĭ poverkhnosti shel'fovogo lednika Rossa ul'trazvukovym datchikom], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.26-32, In Russian. 3 refs.

Methods and results of studies of the freezing and melting processes of the bottom section of the Ross Ice Shelf are reviewed. Ultrasound instruments are illustrated. Findings show that freezing of the drillholes takes place after 10 days on the surface, and after 60 days at the bottom.

F-29730
Strauch, G., Kovsky, P., **Air-bubble composition in ice samples from a deep hole in the vicinity of Novolazarevskaya Station** [Sostav gazovykh vkliucheniĭ v obraztsakh l'da iz glubokoĭ skvazhiny v raĭone stantsii Novolazarevskoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.32-36, In Russian. 8 refs.

Results of chemical analysis of entrapped gas, and the air contents, in ice core samples from depths varying between 0 and 600 m are presented. Illustrations of instruments used for the vacuum extraction of gas are included.

F-29739
Manevskiĭ, L.N., Morev, V.A., Nikiforov, A.G., Pukhov, V.A., IAkovlev, V.M., **Test drilling at Komsomolskaya Station** [Eksperimental'noe burenie na stantsii Komsomol'skoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.71-73, In Russian.

New electrothermal drills were tested for deep glacier drilling in the summer of 1981-1982 on Komsomolskaya Station. Average statistical data, regarding core sizes, time spent drilling, depth of drillholes, time spent on maintenance, etc., are presented.

F-29740
Aver'ianov, V.G., **International cooperation in antarctic glaciation research** [Mezhdunarodnoe sotrudnichestvo v izuchenii oledeneniia Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.73-77, In Russian.

The third international symposium on antarctic glaciological research, convening in Columbus, Ohio, in Sept. 1981, with 135 scientists from 13 different countries participating, is reported. Research done by each country was reviewed, the subject under discussion being mainly the antarctic ice cover, although other research areas, such as the atmospheric processes, were also discussed. The Soviet delegation presented four relevant recommendations at the end of its presentation.

F-29742
Jezek, K.C., **Modified theory of bottom crevasses used as a means for measuring the buttressing effect of ice shelves on inland ice sheets,** *Journal of geophysical research,* Mar. 10, 1984 89(B3), p.1925-1931, 20 refs.

Bottom crevasses are fractures that extend upward into floating ice shelves. They form when seawater penetrates the base of the ice shelf and ruptures the ice up to the level at which englacial stresses equal the stress of the seawater. For a freely floating ice shelf, the penetrating level of closely spaced crevasses is estimated at about half the ice thickness h; for an isolated crevasse the level is about pi h/4. However, an analysis of the heights and locations of bottom crevasses in the Ross Ice Shelf shows that none of the crevasses approach the predicted limits, perhaps because the existing theory does not include the back stress which is present in bounded ice shelves. By reformulating the theory to include a back stress term, back stress can be evaluated experimentally from radar measurements of crevasse height and ice thickness. The magnitude of back stress (2 bars in the grid northwest corner of the ice shelf) suggests the ice shelf is playing an important role in buttressing the inland ice sheet. (Auth.)

F-29745
Clarke, D.B., Ackley, S.F., **Sea ice structure and biological activity in the antarctic marginal ice zone,** *Journal of geophysical research,* MP 1701, Mar. 20, 1984 89(C2), p.2087-2095, 30 refs.

Ice cores obtained during October-November 1981 from Weddell Sea pack ice were analyzed for physical, chemical, and biological parameters. Frazil ice, which is associated with dynamic, turbulent conditions in the water column, predominated (70%). Both floe thickness and salinity indicate ice which is less than 1 year old. Chemical analyses, particularly with regard to the nutrients, revealed a complex picture. Phosphate values are cattered relative to the dilution curve. Nitrate and silicate values are lower than expected from simple scaling with salinity and suggest diatom growth within the ice. Nitrite values are higher in the ice than in adjacent waters. Frazil ice formation which probably concentrates algal cells from the water column into ice floes results in higher initial chlorophyll *a* by subsequent reproduction within the ice. Ice core chlorophyll ranged from 0.09 to 3.8 mg/cu m, comparable to values previously reported for this area but significantly lower than values for Antarctic coastal fast ice. The dominance of frazil ice in the Weddell is one of the major differences between this are and others. Consequently, we believe that ice structural conditions significantly influence the biological cummunities in the ice. (Auth.)

F-29789

Pollard, D., **Ice-age simulations with a calving ice-sheet model,** *Quaternary research,* July 1983 20(1), p.30-48, 43 refs.

Variations of ice-sheet volume during the Quaternary ice ages are simulated using a simple ice-sheet model for the Northern Hemisphere. The basic model predicts ice thickness and bedrock deformation in a north-south cross section, with a prescribed snow-budget distribution shifted uniformly in space to represent the orbital perturbations. An ice calving parameterization crudely representing proglacial lakes or marine incursions can attack the ice whenever the tip drops below sea level. The model produces a large 100,000-yr response in fair agreement with deep-sea core records. To increase confidence in the results, several of the more uncertain model components are extended or replaced, using an alternative treatment of bedrock deformation, a more realistic ice-shelf model of ice calving, and a generalized parameterization for such features as the North Atlantic deglacial meltwater layer. Much the same ice-age simulations as with the original model, are still obtained. The model is run with different types of forcing to identify which aspect of the orbital forcing controls the phase of the 100,000-yr cycles. The model is adapted to represent West Antarctica, and yields unforced internal oscillations with periods of about 50,000 yr. (Auth. mod.)

F-29803

Barnola, J.J., Raynaud, D., Neftel, A., Oeschger, H., **Comparison of CO2 measurements by two laboratories on air from bubbles in polar ice,** *Nature,* June 2, 1983 303(5916), p.410-412, 9 refs.

Results of a comparison between two laboratories are presented, based on measurements from the same ice core sections, which indicate that the measurements can be compared with great confidence. The results suggest that the mean CO2 level recorded by Antarctic ice for the period 800-2,500 yr BP is about 260 p.p.m.v. (Auth. mod.)

F-29806

Jezek, K.C., **Radar investigations of the Ross Ice Shelf, Antarctica,** Madison, University of Wisconsin, 1980, 221p., University Microfilms order No.80-25828, Ph.D. thesis. Refs. p.189-196.

Airborne and surface radar soundings were carried out over the Ross Ice Shelf as part of the Ross Ice Shelf Geophysical and Glaciological Survey. These data have been analyzed to obtain detailed maps of ice thickness, flow lines, surface and bottom crevasse fields and locally detailed studies of bottom crevasses from which inferences were made about the recent history and the present mass balance of the ice shelf, and the implication for future changes in the West Antarctic Ice Sheet. Ice thickness contours show the ice shelf to be a complex, dynamic system. Numerous ridges and troughs in the ice thickness contours cannot be explained by simple steady-state models of ice flow. The correlation of some of the ice thickness anomalies with ocean floor topography and bottom and surface crevasse fields suggests that the grid western Ross Ice Shelf can be characterized by a number of previously unidentified ice rises—areas where the ice shelf becomes grounded on highs in the ocean floor. The effects of ice rises on the ice thickness and velocity field of the ice shelf were incorporated in order to calculate the mass balance of the grid western Ross Ice Shelf. Mass flux changes across flow bands in the grid western Ross Ice Shelf are not significantly different from zero. (Auth.)

F-29817

Jones, D., **Snow stratigraphy observations in the katabat**
wind region of eastern Wilkes Land, Antarctica, *Australi*
National Antarctic Research Expeditions. ANARE
research notes, Dec. 1983 No.17, 18p., 3 refs.

Observations of the snow surface and meteorological conditio
and stratigraphical measurements to a depth of 2-3 m in pits, w
made along a glaciological traverse route, at approximately 2000
elevation in Wilkes Land, between August 29 and November
1982. The traverse route lies entirely in the katabatic wind reg
which encircles the central plateau. The snow surface which dev
ops under the influence of such a constant wind was observed to h
a very hard crust which was covered by a thin icy glaze. It is sugg
ed that the glaze is formed by the dissipation of the kinetic energ
drift by friction and the crust by "sintering" from vapor transp
within the snow pack. Sastrugi were ubiquitous and reached heig
of up to 60 cm, thereby introducing noise levels sometimes equa
or greater than the annual layering observed in the pits. The ex
ence of temperature gradients within the snow surface sufficient
the formation of deep-hoar was inferred from its occurrence at l
once in most annual layers at each site. (Auth. mod.)

F-29820

Oerlemans, J., Van der Veen, C.J., **Ice sheets and climat**
Dordrecht, The Netherlands, D. Reidel Publishing
Company, 1984, 217p., Refs. p.205-212.

DLC QC981.8.I23O37 1

The outlook of the work is global; the intent is to meld glaciol
cal and climatological knowledge into models having time span
decades and centuries. To do this, twelve chapters encompass
cussions dealing with these topics: the global climate system; how
sheets affect climate; modelling ice flow; numerical models of
sheets; ice sheet heat budgets; ice flow and heat budget interacti
bedrock adjustment; response of ice sheets to environments; addit
al environment conditions; Pleistocene glacial cycles; Greenland
antarctic ice sheets; and future ice sheets.

F-29825

Zwally, H.J., Comiso, J.C., Parkinson, C.L., **Satellite-**
derived ice data sets. No. 1: Antarctic monthly averag
microwave brightness temperatures and sea ice
concentrations, 1973-1976, *U.S. National Aeronautics a*
Space Administration. Technical memorandum, 1981
No.83812, 35p., N82-17563, 9 refs.

A summary data set concerning 4 years of Antarctic sea-ice
ditions has been created and is available on magnetic tape. The
were derived from electrically scanning microwave radiom
(ESMR) brightness temperatures and were mapped into a
stereographic grid enclosing the 50 S latitude circle. The grid
varies from about 32 by 32 sq km at the poles to about 28 by
km at 50 S. The microwave brightness temperatures of Antarcti
ice are predominantly characteristic of first-year ice with an emiss
of 0.92 at 19 GHz frequency. Sea ice concentrations were calcu
from the brightness temperature data for each grid element wit
algorithm that uses an emissivity value of 0.92 and an ice phy
temperature estimate from climatological surface air temperat
Monthly, multiyear monthly, and yearly maps of brightness tem
tures and sea ice concentrations were created for the 4 years, ex
for 7 months for which useable data were insufficient. (Auth.

F-29829

Davis, R.W., Castellini, M.A., Horning, M., Davis, M.P
Maintenance of an observation hole through the McM
Ice Shelf for winter oceanography, *Antarctic journal of*
United States, Dec. 1983 18(4), p.12-14.

In text and sketch the authors describe how they drilled
maintained for a year the observation hole which was 1.2 m in di

ter and 16 m deep. Details of the construction are given, site location is identified, advantages of the hut are noted, the underside of the ice is described, and conditions at the sea bottom as the ice shelf moved away from shore are specified.

F-29844

Hogg, I.G.G., Paren, J.G., Timmis, R.J., **Summer heat and ice balances on Hodges Glacier, South Georgia, Falkland Islands Dependencies,** *Journal of glaciology,* 1982 28(99), p.221-238, In English with French and German summaries. 25 refs.

The heat and ice balances of a temperate sub-antarctic cirque glacier were measured through the 1973-74 melt season at an altitude midway between the climatic firn limit and the snout. The melt calculated from mean daily measurements at a single level of net radiation, wind-speed, temperature, and humidity agreed with that observed at nearby budget stakes. In the central ablation zone, radiation provided 54% and sensible fluxes 46% of the heat income through the summer, which was exceptionally warm and sunny. Latent-heat fluxes made no significant contribution to the heat balance. The calculation by Smith (1960) that the radiative, sensible, and latent heat fluxes contribute about equally to ablation in this zone has not been substantiated by measurement. The measured partition of the glacier's heat balance suggested that maritime influences on its regime are mitigated by its position in the lee of a major mountain range. (Auth.)

F-29845

Morgan, V.I., **Antarctic ice sheet surface oxygen isotope values,** *Journal of glaciology,* 1982 28(99), p.315-323, In English with French and German summaries. 20 refs.

Collected data on the mean annual surface values for delta O-18 over Antarctica are tabulated and also presented in map form. An additional map shows contours of constant delta O-18 values. (Auth.)

F-29849

Kukla, G., Gavin, J., **Potential impact of snow and ice variations on the heat budget,** Climate Diagnostics Workshop, 6th Palisades, N.Y., 1981. Proceedings, Washington, D.C., U.S. Department of Commerce, 1982, p.64-71, 3 refs.

DLC QC980.C54a

Indices representing the area of snow and ice, surface albedo and the potential shortwave energy absorption at the surface are based on an analysis of weekly snow and sea ice charts produced by NOAA/-NESS and the Navy/NOAA Joint Ice Center. Derivations of these indices are explained and examples are shown in polar charts. (Auth. mod.)

F-29855

U.S. Naval Polar Oceanography Center, **Antarctic ice charts 1981-1982,** Washington, D.C., 1982, 216p. ADA-132 383.

This publication is the fifth in a continuing bi-yearly series of antarctic sea ice atlases prepared in the Joint Ice Center at the Naval Polar Oceanography Center, Suitland. The atlas contains weekly charts depicting Southern Hemisphere ice conditions and extents. The information presented was prepared under operational time constraints principally from satellite imagery supplemented by conventional observations. Table 1, located on the inside back cover, summarizes satellite data availability for 1981 and 1982.

F-29859

Langway, C.C., Jr., **International polar research,** *SUNY research '84,* May/June 1984 4(3), p.3-7.

The author follows up on an earlier article (H. Neal, this publication, Vol.3(5)) in which it was stated that the United States stands to gain more than it would lose in vigorous international cooperative scientific efforts. Supporting this view, the present author cites the international scientific endeavors in Antarctica and Greenland. He also traces the gradual development, over the years, of international scientific research on glaciers as custodians of historical earth processes.

F-29863

Clapperton, C.M., Sugden, D.E., **On late-glacial and holocene glacier fluctuations in maritime West Antarctica,** Colloquium on Late- and Postglacial Oscillations of Glaciers: Glacial and Periglacial Forms, Trier, Germany, May 15-17, 1980. Proceedings. Edited by H. Schroeder-Lanz, Rotterdam, A.A. Balkema, 1983, p.283-290, With German and French summaries. 10 refs.

Glacier fluctuations probably dating from the Late-Glacial and Holocene periods are described for South Georgia and Alexander Island. On South Georgia one group of moraines was deposited between 2,000 and 10,000 yr. B.P. and two others were formed during the Little Ice Age (19th Century) and since the 1930's. On Alexander Island complex relationships exist between George VI ice shelf and the small local glaciers. The one available date (on barnacle shells) indicates a) that local glaciers formed two moraines before c. 6,500 yr. B.P., b) that since c. 6,500 yr. B.P. the ice shelf reformed and advanced to form two moraines, that local glaciers also formed two moraines; the inner moraines are ice-cored, the outer are ice-free. (Auth.)

F-29876

Broecker, W.S., **Ocean,** *Scientific American,* Sept. 1983 249(3), p.146-160.

Cores removed by deep boring into the Greenland and Antarctic ice sheets, reaching down to ice that was formed 80,000 years ago, when crushed in a vacuum, released fossil air. Analysis showed that air from ice formed during the peak of the most recent glacial episode, some 18,000 years ago, has only about 70% as much carbon dioxide as air from ice formed during the present interglacial period. This increase in atmospheric carbon dioxide at the end of glaciation is explained by changes in ocean chemistry.

F-29894

Greischar, L.L., **Analysis of gravity measurements on the Ross Ice Shelf, Antarctica,** Madison, University of Wisconsin, 1982, 210p., University Microfilms order No. 82-16247, Ph.D. thesis. Refs. p.158-164.

RIGGS measurements of water layer thickness beneath the Ross Ice Shelf indicate that there are extensive areas near the present grounding line where the water layer is thin enough so that sea floor uplift of the order of 100 m could lead to at least 100 km of grounding line advance. Regional gravity anomalies and calculations using the Stuiver, et al. (1981) ice sheet reconstruction and a simple exponential model of uplift independently predict present remaining uplift for the grid NW area of the Ross Ice Shelf of about 100 m. If the West Antarctic ice sheet is approximately in steady state, an advance of the grounding line into the Ross Ice Shelf is expected. The maximum extent of this advance would not be past the middle of the present Ross Ice Shelf as the sea floor depth generally increases to the grid east. Such an advance would result in lowering of world sea level of the order of 0.5 m. (Auth.)

F-29919

Peel, D.A., **Antarctic ice: the frozen time capsule,** *New scientist,* May 19, 1983 98(1358), p.476-483.

The author explains how the antarctic ice cores are gathered and examined for residues of atmospheric pollution. Chemical elements are identified and times of deposition are determined. Photographs and sketches augment the text to portray the concepts and methods used in the drilling programs. Interpretations of data are given.

F-29935

Kotliakov, V.M., Diurgerov, M.B., Korolev, P.A., **Accumulation and mass balance of the large ice-catchment basin in East Antarctica** [Akkumuliatsiia i balans massy krupnogo ledosbornogo basseĭna Vostochnoĭ Antarktidy], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ. Khronika obsuzhdeniia,* Apr. 1983 Vol.47, p.49-61, In Russian with English summary. 17 refs.

Glaciological studies along the Pionerskaya-Dome C route continued through the 1977-82 period under the IAGP program. The traverse crossed the East Antarctic basin which covers an area of 1,250,000 sq. km. Accumulations were measured at 7 snow survey polygons at 575 stakes, also in pits and boreholes. Surface velocities of glacier motion were determined by the doppler method. Rates of accumulation decreased from the Pionerskaya Station to Dome C, their value differences reaching up to 200% in separate years, the measurement error being 12%. The maximum space and time variability was registered in the altitude range of 2.8-3.0 km, in the transition area from the slope to the high antarctic plateau. Mass balance computations were obtained for an ice-catchment basin with an area of 421,000 sq. km. Calculations revealed a 28% excess of accumulation over ablation.

F-29936

Zakharov, V.G., **Surges of the Denman outlet glacier and their relations to the state of the Shackleton Ice Shelf in Antarctica** [Podvizhki vyvodnogo lednika Denmena i ikh sviaz' s sostoianiem shel'fovogo lednika Shekltona v Antarktide], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ. Khronika obsuzhdeniia,* Apr. 1983 Vol.47, p.75-79, In Russian with English summary. 9 refs.

Present state of the Shackleton Ice Shelf and its changes during the last 80 years are discussed on the basis of space images, direct observations and remote sensing information of the area. Data discussed indicate that the glacier has basically preserved its outlines during the last 30-40 years, except in the parts considerably disturbed by intrusions of the Denman and Scott outlet glaciers, where cyclic oscillations were observed with periods of about 40 yrs. The first Denman surge occurred about 1905-07, the second in 1947 and the third started in 1956, presently proceeding and possibly lasting to the end of the 1980-ies. The Denman surges show stages of advancing (30 yrs) and destruction of its floating part (about 10 yrs). Large icebergs, breaking off the Denman glacier, may exist near the shelf glacier for the next 20 years, detained by sea bottom uplifts, located 100-120 km from the Shackleton front.

F-29938

Zotikov, I.A., **Studying ice cores from the Ross Ice Shelf** [Izuchenie ledianogo kerna iz shel'fovogo lednika Rossa], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ. Khronika obsuzhdeniia,* Apr. 1983 Vol.47, p.243, In Russian.

Ice cores obtained from the deepest wells of Antarctica and Greenland were kept in commercial freezers at the geological faculty of the New York State University in Buffalo. Investigations revealed lower saline ice layers, with indications of sea-water origin by accretion, in places removed from shores. A simple mathematical model was derived, describing the cyclic melting-accretion processes at the Ross glacier bottom. This scheme was tested for simplest conditions and approved for further computer studies of more complex conditions in different parts of the glacier. Structure, physical properties and inclusions in the cores, studied microscopically, revealed sudden changes in crystal sizes, forms and orientation, and inhomogeneity of inclusion densities along the core. This evidence suggests the necessity of continuous monitoring of heat-mass transfer beneath the glacier, using acoustic devices for measurements of ice accretion and separation of short-range seasonal variations.

F-29939

Drewry, D.J., **Antarctic ice sheet: aspects of current configuration and flow,** Mega-geomorphology, edited by R. Gardner and H. Scoging, Oxford, England, Clarendon Press, 1983, p.18-38, 43 refs.

DLC GB400.2.M43 1983

The Antarctic Ice Sheet is formed of three unequal parts. Together, the large 10.35 million sq km East Antarctic Ice Sheet, the smaller 1.97 million sq km West Antarctic Ice Sheet with flanking, floating ice shelves in the Ross (0.54 million sq km) and Weddell (0.53 million sq km) Seas, and the Antarctic Peninsula (0.52 million sq km) comprise an area of complex glaciation with several merging ice caps, ice shelves, extensive mountainous terrain, outlet glaciers, and ice-covered offshore islands. A Landsat image of a typical coastal section of East Antarctica is presented. This paper deals primarily with aspects of the present-day Antarctic Ice Sheet, and examines its configuration in relation to the flow properties of ice and the steady-state hypothesis. (Auth.)

F-29961

Ishida, T., Maeno, N., **MEM spectrum analysis of snow densities,** *Low temperature science (Teion kagaku). Series A Physical sciences,* 1983 No.42, p.57-64, 7 refs., In Japanese with English summary.

The maximum entropy method (MEM) can be applied to analyses of various time-series data, giving very accurate power spectra from short data. This paper gives a short explanation of MEM and procedure of its calculation. The method of processing data in suitable forms to MEM analyses is also introduced with special reference to data of snow densities of Antarctic core samples. (Auth.)

F-29962

Kobayashi, S., Ishikawa, N., Ohata, T., **Snow storm with strong wind in Antarctica,** *Low temperature science (Teion kagaku). Series A Physical sciences,* 1983 No.42, p.65-79, 13 refs., In Japanese with English summary.

A series of measurements of the mass flux of blowing snow under conditions of a strong wind and a snowfall was made on a katabatic wind slope at Mizuho Station in East Antarctica during the wintering party in the 21st Japanese Antarctic Research Expedition (JARE-21) in 1979-1981. The total snow drift transport in a unit time through a unit width of the vertical surface perpendicular to the wind direction was obtained by integrating mass fluxes vertically between two given heights Z=0 (surface) and Z=28 m. Under strong wind condition with a snowfall snow suspended at a higher level than under conditions of pure blowing snow, but the total snow drift transport was of the same order in both conditions. However, the height of the suspension of snow was up to 70 m in the former, whilst it was up to 10 m in the latter. (Auth. mod.)

F-29973

Bentley, C., **West antarctic ice sheet: diagnosis and prognosis,** Carbon dioxide research conference: Carbon Dioxide, Science and Consensus. Berkeley Springs, W.VA., Sept. 19-23, 1982. Proceedings, Washington, D.C., Oak Ridge Associated Universities, Feb. 1983, p.4.3-4.73, DE83007182, Refs. p.4.69-4.73.

Extensive measurements on the Ross Ice Shelf present a picture of an ice shelf subject to relatively rapid changes, perhaps constantly out of steady state, but not undergoing a long-term secular change. The implication for the future is that from natural causes alone the ice shelf is more likely to increase in thickness than to decrease; in fact, there is a distinct possibility of a surging history and a present-day build-up towards a future surge. Furthermore, it appears that the ice shelf would be relatively invulnerable to the most direct effects of climatic warming: a temperature rise would take many hundreds of years to penetrate deeply into the shelf, and increased precipitation on the shelf can be expected to have only a minor effect. However, increased bottom melting could be much more effective: if there were to be an oceanic temperature increase of several degrees it is possible that a substantial thinning could occur in a hundred years. A maximum-reasonable-rate analysis of the problems relating to rapid evacuation of the large volume of West Antarctic ice leads to an estimate of 500 years for the minimum time required. It is concluded that the West Antarctic ice sheet is currently healthy and will probably be around for many centuries to come. (Auth.)

F-29974

Gordon, A.L., **Comments about the ocean role in the antarctic glacial ice balance,** Carbon dioxide research conference: Carbon Dioxide, Science, and Consensus. Berkeley Springs, W.VA., Sept. 19-23, 1982. Proceedings, Washington, D.C., Oak Ridge Associated Universities, Feb. 1983, p.4.75-4.86, DE83007182, 14 refs.

Deep water temperature adjacent to the continental margins varies with longitude from near 0.5 C in the Weddell region to closer to above 1.5 C in the Bellingshausen-Amundsen Seas. Intrusion of Circumpolar Deep Water (CDW) onto the continental shelf supplies heat which could melt glacial ice. The CDW temperature is surprisingly vulnerable to sudden change as revealed by a 0.4 C decrease during the 1970's in the Weddell Sea. A CO2-induced climate alteration would most likely change the CDW temperature which in turn could influence the glacial ice melting rate. A hypothesis is presented linking CDW temperature to pycnocline stability, with increased warming as pycnocline stability inhibits vertical heat flux into the surface water and atmosphere. Increases in CDW temperature of 0.5 C seem possible, given the results of climate models and using reasonable assumptions. (Auth.)

F-29976

Wakatsuchi, M., **Brine exclusion process from growing sea ice,** *Hokkaido University, Sapporo, Japan. Institute of Low Temperature Science. ontribution,* 1983 No.33, p.29-65, 23 refs.

The exclusion process of brine from growing sea ice, which plays an important role in the polar ocean, has been quantitatively studied in the field and laboratory in which sea ice grew under various conditions. From oceanographic observations during the growth of sea ice in the Antarctic winter it was found that a haline convection induced by brine exclusion changed the salinity structure of shelf water from stratified to homogenized distribution, yielding the salinization of the water. The appearance of the excluded brine falling into the seawater was experimentally observed by means of a schlieren optical system, with the following findings: The excluded brine formed long vertical filaments starting at fixed positions on the water-ice interface and fell into the underlying seawater without appreciable diffusion. The characteristics of the brine filaments varied with the ice growth rate. At a higher ice growth rate, a larger number of thinner brine filaments fell at a lower velocity. Direct measurements were made of the salinity and volume of the excluded brine under various conditions of ice growth. (Auth. mod.)

F-30023

Paterson, W.S.B., Waddington, E.D., **Past precipitation rates derived from ice core measurements: methods and data analysis,** *Reviews of geophysics and space physics,* May 1984 22(2), p.123-130, 33 refs.

New data analyses suggest that precipitation at Camp Century has fluctuated by only plus or minus 10% for the past 8500 years, whereas at Devon Island, on the opposite side of Baffin Bay, precipitation has been uniform only for the past 1300 years, with significantly higher values before that. Estimation of pre-Holocene precipitation rates is especially difficult because that ice may have an effective viscosity different from Holocene ice. Data from three Antarctic stations show some inconsistencies. Measuring concentrations of Be-10 in ice cores may be an alternative method of determining past precipitation rates. (Auth.)

F-30026

Watts, R.G., Hayder, E., **Two-dimensional, seasonal, energy balance climate model with continents and ice sheets: testing the Milankovitch theory,** *Tellus,* 1984 36A(2), p.120-131, 28 refs.

A simple seasonal, two-dimensional, energy balance climate model that contains an ice sheet model is forced by varying the orbital parameters. If a mechanism that enhances melting during ice sheet retreat is introduced, variations in ice volume resembling those deduced from oxygen isotope variations are predicted. Since the Milankovitch theory asserts that cool high latitude summers lead to the growth of ice sheets, a seasonal climate model with continents must be used to test the theory. An ice sheet model must also be included because the presence of an ice sheet leads to a large amplification of its own size. When all three of these ingredients are present in the model, very large ice sheets can be produced. A strong 100 kyr cycle is present only if a mechanism that enhances ice sheet collapse is introduced. Other predicted features of past climate variations, such as ocean temperature and sea ice variation, also resemble paleoclimate reconstructions from proxy data. (Auth.)

F-30027

Van der Veen, C.J., Oerlemans, J., **Global thermodynamics of a polar ice sheet,** *Tellus,* May 1984 36A(3), p.228-235, 13 refs.

The global characteristics of a polar ice sheet are investigated. When looking at a drainage system as a whole, conservation of heat yields a very simple functional relation. Coupling this relation to an equation describing the large-scale dynamics of a drainage system makes it possible to study the feedback of thermodynamics on the ice-mass discharge. It is found that the temperature-ice flow feedback (including the effect of basal meltwater) can give rise to bifurcation. For certain combinations of air temperature and mass balance, two stable flow regimes are possible for a polar ice sheet: fast flow, with high basal temperatures and slow flow, with low basal temperatures. Basal melting is strongly reduced when the accumulation rate increases. Thus a polar drainage system can be brought into the fast flow regime (with meltwater present) by reducing the mass balance, or by increasing the air temperature. The calculation of the global heat budget is also applied to flow lines of the antarctic ice sheet. For the flow line into the Ross Sea a large imbalance is found to exist. It seems that the ice sheet is cooling here, and consequently, building up. (Auth.)

F-30040

Nishio, F., ed, **Glaciological research program in East Queen Maud Land, East Antarctica. Part 1, 1982-1983,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, 117p., Refs. passim. For individual papers see F-30041 through F-30045, F-30047, and I-30046, or 38-3712 through 38-3717.

The data of a five-year glaciological research program in East Queen Maud Land are presented, and its primary objectives described as follows: dynamical study of the ice sheet; studies of accumulation mechanism on the plateau south of the katabatic wind area; and ice coring. The JARE-23 field work activities from January 1982 to February 1983 are listed and the oversnow traverses in that period are tabulated and mapped. Data cover position, elevation and ice thickness of stations along routes S, H and Z; net accumulation of snow by stake method; density of surface snow cover; stratigraphic and density data from ice cores; surface slopes of the ice sheet; meteorological data and direction of the long axis of a sastrugi.

F-30041
Nishio, F., Ishikawa, M., Ohmae, H., **Station position, elevation and ice thickness between Syowa and Mizuho stations,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.6-14, 2 refs.

The position and elevation of traverse stations along the routes S, H and Z, between Showa and Mizuho stations, occupied during a 1973 survey, are tabulated along with ice thickness, and bedrock elevation measured at the same stations in 1983.

F-30042
Takahashi, S., **Net accumulation of snow by stake method in 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.15-61, 6 refs.

The net accumulation of snow was measured by the stake method along the oversnow traverse routes of JARE-23. Seven tables show the following: summarized stations, routes and periods of observation; annual net accumulation along routes S, H and Z from Jan. to April 1982, April to Sept. 1982, and Sept. to Jan. 1983; net accumulation along route YM from March to Oct. 1982 and Oct. 1982 to Jan. 1983; net accumulation along route SS in Oct. and Nov. 1982; net accumulation with a 9-stake plot at Mizuho Station from Jan. 1982 to Jan. 1983; net accumulation with a 36-stake plot, at the same station, from Dec. 1981 to Jan. 1983; and net accumulation with a 201-stake plot at the same station and for the same period of time.

F-30043
Ohmae, H., **Density of surface snow cover along routes S, H and Z,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.62-63.

The density of surface snow cover was measured in kg/cu m along routes S, H and Z in January 1982. The calculated values are tabulated.

F-30044
Nishio, F., **Stratigraphy and density data from ice core drilled at G2 grid station,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.64-83.

Results of stratigraphic analyses are given for layer boundary, multilayered ice crust, grain size and depth hoar levels of an ice core 127.655 m long. Density and cumulative mass per unit area, and the average density and cumulative mass per unit area for 1 m increments from the surface to the bottom, are tabulated. Density-depth profiles are also shown.

F-30045
Ohmae, H., **Surface slopes of the ice sheet,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.84-101, 1 ref.

Readings of measurements and the patterns of distribution of surface slopes of the ice sheet, obtained during traverses along routes S, H and Z at positions for geodetic survey, and routes YM, SS, IM and K at 20-50 km intervals, are presented.

F-30047
Ohmae, H., **Direction of long axis of a sastrugi,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.114-116.

The definition of sastrugi, as forms eroded by katabatic winds, and data and a map of traverse routes, stations and direction of the long axis of sastrugi, measured at 20 km intervals, are presented.

F-30057
Strokina, L.A., **Polar ice cap albedo as a function of air temperature,** *Soviet meteorology and hydrology,* July 1980 No.7, p.43-46, 13 refs. For Russian original see 35-1004, or 12F-24085.

The dependence is considered between albedo of snow-ice surface and air temperature as well as incident angle of solar rays in the Arctic and Antarctic ice-covered areas aimed at more accurate allowance for the feedback between the thermal regime and polar ice area in climatic models. (Auth.)

F-30058
Bagrov, N.A., **On the motion of continental ices.** *Soviet meteorology and hydrology,* Nov. 1980 No.11, p.42-49, 12 refs. For Russian original see 35-2249, or 12F-24486.

The problem of motion of continental ice is considered using the hypothesis of linearity of resistance to motion. It is ascertained that the motion speed is proportional to the glacier surface inclination. A model of a circular glacier is constructed and applied to the Antarctic glacier. Results are in fairly good agreement with available data when one component (the resistance coefficient) is given. (Auth.)

F-30059
Davydov, E.N., Makhon'ko, K.P., **Use of the method of isotope glaciology for studying nuclear explosion products in Antarctica,** *Soviet meteorology and hydrology,* 1982 No.5, p.36-42, 17 refs. For Russian original see 37-2156, or 13F-27689.

Data on the content of radioactive products of nuclear explosions in annual ice layers at Mirnyy, Molodezhnaya, Bellingshausen and Vostok stations are utilized for calculating atmospheric fallout P and concentration in air q of these products in preceding years, when direct measurements of P and q were not carried out; the satisfactory accuracy of the suggested method for calculation of q is shown. The transformation of properties of the aerosol impurity during its transport from the northern hemisphere to the antarctic coast is discussed. The time of transport of air masses from the northern hemisphere into the southern in the troposphere and stratosphere is determined, as well as the time of semi-removal of the impurity from the stratosphere in the southern polar region and the effective rate of its sedimentation. The difference in the behavior of aerosol impurity and water vapor in the atmosphere of Antarctica is demonstrated. (Auth.)

F-30097
Miagkov, S.M., **History and predictions of changes in the antarctic ice cover** [Istoriia i prognoz izmeneniĭ Antarkticheskogo lednikovogo pokrova], *Moscow. Universitet. Vestnik. Seriia 5 Geografiia,* May-June 1984 No.3, p.10-17, In Russian with English summary. 20 refs.

The variation of the size of the Antarctic ice cover is considered as directly reflecting the history of changes in the level of the ocean. A delay in the beginning of glaciation relative to the time the Antarctic Continent had acquired its polar position can be explained by the fact that the continent had remained submerged by seas up to the Upper Oligocene. The expected technogenic warming of the climate is not likely to result in changes of the Antarctic ice cover that could cause a dangerous rise in the level of the ocean. (Auth.)

F-30099

Ito, K., Ikami, A., **Upper crustal structure of the Prince Olav Coast, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 Ser C No.15, p.13-18, 10 refs.

Ten seismic stations were set along a line with a length of about 10 km at intervals of about 1 km. Each station consists of a seismometer and a direct analogue data-recorder with an electric panel-heater in an insulated box. The observed travel times of the first and later arrivals from two explosions at both ends of the line were analyzed. The *P*-wave velocity of the basement complex is 6.02 km/s which is a typical value in East Antarctica. This basement complex is covered by the ice sheet with the thickness of about 700-1000 m. No layer with a velocity less than 6 km/s is detected between the ice sheet and the basement complex. (Auth.)

F-30101

Ikami, A., Kaminuma, K., **Velocity distribution on ice sheet in Prince Olav Coast, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 Ser C No.15, p.29-35, 15 refs.

A refraction experiment with a 100-kg charge was carried out in the ice sheet in the Prince Olav Coast, East Antarctica by the 21st Japanese Antarctic Research Expedition (JARE-21) in 1980. Prominent Rayleigh waves were clearly recorded in a distance range of 2 to 8 km from the explosion point. The maximum period of Rayleigh waves was 0.7 s with a phase velocity of 1.8km/s. A phase velocity of surface waves is considered to be most sensitive to the *P*- and *S*-wave velocity structures of ice layers to a depth of one-fourth of the wave length. Since the longest wave length of Rayleigh waves in the present experiment is estimated to be 1300 m for the maximum period of 0.7 s (1.8 km/s in phase velocity), *P*- and *S*- wave velocity structures of ice layers to a depth of 300 to 400 m may be inferred from the dispersion curves. Assuming velocity structures of ice sheet in the Mizuho Plateau based on the previous works of JARE, theoretical dispersion curves were calculated for three different velocity structures and they were compared with the observed ones. (Auth. mod.)

F-30102

Ito, K., Ikami, A., **Amplitudes of seismic waves on ice sheet in East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 SDer C No.15, p.36-42, 8 refs.

In 1979-81, ten shots were fired in drill holes at the Prince Olav Coast and the Mizuho Plateau, Antarctica, for explosion seismic experiments by JARE-20, -21 and -22. The yield ranged from 10 to 1400 kg. An empirical relationship between yield and maximum amplitude of seismic wave was derived for shots in drill holes in ice sheet. The maximum amplitudes obtained are compared with those generated from explosion in sea water in Antarctica and in solid rock in Japan. The amplitude of the biggest shot of 1.4 t detonated in the ice sheet is nearly the same as that in solid rock in Japan. The maximum amplitudes of seismic waves generated from a 1-t explosion in sea water are about 8 to 10 times larger than those from equivalent explosions in the ice sheet. The relation is similar to the results obtained for shots in sea water and solid rock in and around Japan. (Auth. mod.)

F-30103

Ikami, A., Ito, K., **Nature of noises on ice sheet in East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 Ser C No.15, p.43-60, 5 refs.

Two types of noise recorded in seismic explosion experiments around Showa Station are discussed. One is wind-induced noise which is detected directly by a seismometer. This type of noise increases with wind velocity, and when the wind velocity is over 15 m/s, seismic observations are not successful. To reduce noise, seismometers buried in a hole at depths of 3, 5 and 10 m were examined, but the noise persisted at 10 m. Seismometers should be buried deeper than 10 m. Another is electrostatic noise which frequently deranges a clock signal or destroys an electric circuit in the worst case. This noise is caused by drifting electrified snow. To reduce this noise, the cable should be as short as possible and be laid in parallel with the direction of wind. (Auth.)

F-30157

Meier, S., **Statistical characteristics of variations in the movements of polar ice streams** [Statistische Eigenschaften von Bewegungsschwankungen polarer Eisströme], *Geowissenschaftliche Mitteilungen,* 1982 No.21, p.41-66, In German with English summary. 25 refs.

The bedrock topography of polar ice streams is transferred to the longitudinal profiles of velocity and strain with the same or similar structure. For an optimum prediction of the signal of movement from discrete measuring values, the statistical properties of position-dependent variations in movement and of measuring errors should be known. The distribution of ordinates and multipoint correlation functions are given. The signal-to-noise ratio is a criterion for the special form of ordinate distribution and the quality of linear prediction. Theoretical results are tested on the longitudinal profile of the surface velocity of a temperate arctic glacier and a cold antarctic glacier with temperate subice, and are applied to signal prediction and estimation of flow properties. (Auth.)

F-30181

Hibbs, A.R., Wilson, W.S., **Satellites map the oceans,** *IEEE spectrum,* Oct. 1983 20(10), p.46-53.

The many uses of satellite remote sensing are described, such as measuring the wind at sea, monitoring sea-surface temperatures and tracking chlorophyll from the sky. Antarctic sea ice is monitored by the microwave radiometer on board the *Nimbus-5* spacecraft. The data are shown in two illustrations. The winter image reveals a large patch of ice-free water of approximately 200,000 sq km; the summer image shows the large seasonal change in ice cover.

F-30263

Squire, V.A., **Sea ice,** *Science progress,* Spring 1984 69(273), p.19-43, 35 refs.

An extensive study of the various properties of sea ice, primarily in the Arctic Ocean, is presented. Two paragraphs deal with the southern ocean, describing the antarctic zone water masses and the influence of sea ice on local oceanography.

F-30317

Alley, R.B., Whillans, I.M., **Response of the East Antarctica ice sheet to sea-level rise,** *Journal of geophysical research,* July 20, 1984 89(C4), p.6487-6493, 34 refs.

A nonsteady ice-flow model that explicitly includes longitudinal stresses is used to study the effects of marginal changes on the interior portions of an ice sheet. Sea-level rise causes a wave of thinning to propagate upglacier, and this wave is slowed, diffused, and damped. At the ice divide at dome C in central East Antarctica, post-Wisconsinan sea-level rise is modeled as having caused 110 m thinning, with response now 70% complete. If accumulation rates increased by 10% at the same time, then calculated net thinning has been only 75 m. Ice-sheet response to changes in sea level and accumulation rate is relatively rapid; response to temperature changes is an order of magnitude slower. Response times are shorter if the marginal position of an ice sheet is controlled. (Auth.)

F-30323

Dubrovin, L.I., **Freezing of sea water in shelf glaciers** [Vymerzanie morskoĭ vody v shel'fovom lednike], *Khimicheskaia geografiia i gidrogeokhimiia,* 1962 2(3), p.41-44, In Russian. 5 refs.

DLC GB651.K53

Sea water was found in ice cores 41.5 m deep drilled in the shelf glacier under Lazarev Station. The glacier is approximately 180 m thick and its highest surface reaches 25 m above sea level. Chemical composition of the brine, and brine characteristics at different temperatures, are tabulated showing an increase of brine concentration with decreasing temperature.

F-30332

Devirts, A.L., Vilenskiĭ, V.D., Grinenko, V.A., Erokhin, V.E., Chernikova, N.S., **Anomalous isotopic composition of hydrogen in the snow cover of central Antarctica** [Ob anomal'nom izotopnom sostave vodoroda v snezhnom pokrove Tsentral'noĭ Antarktidy], *Geokhimiia,* July 1979 No.7, p.1101-1105, In Russian. 9 refs.

DLC QE515.G4

Tritium, deuterium and oxygen-18 contents, measured at Vostok Station in various snow layers ranging from 0 to 200 m in depth, showed a relationship between anomalous deuterium increase and high tritium content in the 1926 to 1929 precipitation. It is suggested that the excess deuterium (unlike the tritium) originated in the upper atmosphere; the possibility is not excluded of a link between the deposited deuterium and solar flares.

F-30356

Ait Ouahman, A., Glangeaud, F., Benoist, J.P., **Evolutive spectral analysis by autoregressive process of isotopic climatic data from Antarctica,** Lecture notes in biomathematics, No. 49, Rhythms in biology and other fields of application: deterministic and stochastic approaches. Proceedings of the Journées de la Société Mathématique de France, Luminy, France, September 14-18, 1981. Edited by M. Cosnard, J. Demongeot and A. Le Breton, Berlin, Springer, 1983, p.274-294, With French summary. 36 refs.

The time scale is one of the problems when studying climatic isotopic series. For a 906 m deep ice core from Dome C, evolutive spectral analysis with an autoregressive model suggests that the accumulation rate during the last glacial age (about 15,000 to 30,000 years BP) is 75% of the present value. This confirms the previously determined time scale. Assuming the accumulation rate to be about 3.7 cm/yr of ice equivalent for the Holocene, the data contains three periodicities (2,500 years, 1,330 years and 830 years). If these results are confirmed, they could ensure, a posteriori the chronologies found using a similar approach for ice cores from Camp Century (Greenland) and Byrd Station (Antarctica). (Auth.)

F-30358

Kuroiwa, D., ed, **Physical and chemical studies on ice from glaciers and ice sheets** [Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu], Sapporo, Hokkaido university, Mar. 1974, 125p., Collection of 15 papers presented at two seminars, Dec. 1973 and Oct. 1974 at Hokkaido University. One paper in English, others in Japanese.

Among seminar topics discussed were: ice cores from Byrd Station; internal friction of snow; sonic wave velocities of core samples; ice under high pressure; dielectric properties of compressed snow; ice core electrical properties; chemistry of polar snow; snow density; ice fabrics; structure of deep ice cores; changes in ice crystals c-axes; preferred orientations of ice crystal main axis; glacier ice fabrics.

F-30359

Higashi, A., Shoji, H., **Mechanical properties of deep ice core samples obtained at Byrd Station, Antarctica** [Nankyoku hyosho shinbuhyo no rikigakuteki seishitsu], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.1-13, In Japanese. 16 refs.

Mechanical properties of Antarctic deep ice core (Byrd Station core 1968) were investigated by constant strain rate tensile experiments. The maximum stress obtained from the stress-strain curve was related to the strain as they satisfy Nye's flow law. Values of stress change according to the strain rate, temperature and the orientation of tensile axes of specimens with respect to the core axis. Preliminary analyses were carried out for clarifying the mechanism of the change of mechanical properties owing to the crystal fabric.

F-30360

Kuroiwa, D., Kawamura, T., **Measurements of Young's modulus in the internal friction of compressed snow and antarctic snow** [Jinkoteki ni atsumitsu shita seppyo to nankyoku seppyo no danseiritsu to naibu masatsu], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.15-22, In Japanese. 4 refs.

The Young's modulus and the internal friction of snow were measured in the temperature range of 0 C to -180 C by the flexural vibration method. Snow samples were obtained by compressing sieved snow mechanically up to the densities of 0.56, 0.73, 0.82 and 0.87 g/cm3. The measurements were carried out immediately after preparing the sample and after 70 days of annealing to examine the effect of annealing on Young's modulus and internal friction. The data obtained on the compressed snow samples were compared with those of snow samples obtained in the Antarctic with the same densities as the former. It is found that Young's modulus always increases with decreasing temperature. Internal friction due to the grain boundaries decreases with annealing time. The activation energies for proton movement were 3.5-5.0 and 6.3-7.6 Kcal/mol for the compressed snow and the Antarctic snow, respectively.

F-30361

Yamada, T., **Relation between sonic wave velocities and structure of core samples obtained at Mizuho Camp, Antarctica** [Mizuho kansoku-kyoten yori saishu sareta boringu koa (fukasa 75m) no kozo, soshiki to tatenami, yokonami no denpan sokudo to no kankei], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.23-27, In Japanese. 7 refs.

Sonic wave velocities, Vp and Vs, of ice core samples obtained at Mizuho Camp were measured by a pulse method at -10 C. The frequency of sonic wave used in this experiment was 400 kHz for Vp and 40 kHz for Vs. The error of the measurement of the wave velocity was within 3%. The results of the measurement show the density dependence of Vp and Vs. In depth hoar region (1-4m deep), an anisotropy of Vp was observed but Vs depended only on the density of the core samples.

F-30362

Mae, S., Yamamoto, K., **Experimental apparatus for study of physical properties of ice under high pressure** [Nankyoku hyosho teibu no jikkenteki kenkyu (I.). Kenkyu mokuteki to koatsu jikken sochi], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.29-32, In Japanese. 5 refs.

The antarctic ice sheet is compressed at high pressure due to its own weight. For example, the compressive pressure near the bottom of the ice sheet reaches the value of 400 bar. Under such a high stress the flow properties of ice are deemed to be different from those at ordinary pressure. To measure flow properties we designed an instrument for creep testing at pressures between 0 and 400 bar. A special feature of this instrument is that we can observe ice specimens deforming under high pressures through a strengthened quartz glass window.

F-30363

Maeno, N., **Investigations of electrical properties of deep ice cores obtained by drilling in Antarctica,** Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.45-56, 16 refs.

The paper reports on studies of relationships between the dielectric constant in antarctic ice, ice core depth, density, and particle bonding due to compression. Materials used are described and methods of analysis are explained. Results are shown and differences between antarctic ice under great pressure and pure ice at atmospheric pressure are pointed out. Reasons for these differences are discussed in some detail and are illustrated in graphs and diagrams.

F-30364

Yamada, T., Hasemi, T., **On the relation between structure and thermal conductivity of sub-surface snow at Mizuho Camp, Antarctica** [Mizuho kansoku-kyoten ni okeru hyomen sekisetsu-so no soshiki to netsudendoritsu to no kankei ni tsuite], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.57-63, In Japanese. 9 refs.

At Mizuho camp, snow temperatures were measured at depths of 10, 27, 67, 140, 230, 480 and 980 cm from October 26, 1971 to January 10, 1972. The density of the surface snow was 0.4 g/cu cm. Using an equation of thermal conductivity, we simulated the snow temperature based on the thermal conductivity values obtained previously. Thermal conductivities are shown and the calculated temperatures are presented indicating the differences between the measured temperature and the calculated one. The difference may be caused by the texture of snow.

F-30365

Murozumi, M., Nakamura, S., **Chemical investigation of polar snow strata** [Kyokuchi hyoshohyo no kagakuteki kenkyu], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.65-75, In Japanese. 7 refs.

Chemical features and profiles of ice sheets in Mizuho Plateau and West Enderby Land have been revealed by means of newly developed analytical techniques such as atomic absorption spectrophotometry and isotope dilution surface ionization mass-spectrometry. The chemical concentration is at the level of only ppb even for major components, Na, K, Ca and Mg, chemical properties being homogeneous in the surface sheet but of much vertical complexity. Silicate dusts which functioned as the condensation nuclei for the formation of snow flakes are poor, while sea salts account for more than 90 percent of the total weight of components. Annual accumulation of chemical components is 0.1 for silicate dusts and 0.40, 0.03, 0.1 and 0.06 microg/sq cm for Na, K, Mg and Ca originating in sea salts.

F-30366

Endo, Y., **Densification of snow in East Antarctica** [Higashi nankyoku tairiku no sekisetsu no atsumitsu], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.77-83, In Japanese. 9 refs.

The relation between compactive viscosity factor and density of snow in East Antarctica is derived from the density profiles from the surface to a depth of 10m and the mean annual snow accumulations observed along the route of the Japanese traverse, Showa-South Pole, 1968-69. Assuming that the strain rate in viscous compaction of a snow layer is proportional to the vertical pressure exerted by the weight of the overlying snow and that the annual accumulation is constant, the compactive viscosity factor is calculated. From this calculation, various manipulations are performed using additional parameters and several constants to calculate density-depth curves for East Antarctica.

F-30367

Wakahama, G., **On the structure and texture of deep ice cores from Amery Ice Shelf, Wilkes Dome and Cape Folger, Antarctica** [Nankyoku Ameri-danagori, Uirukusu-hyokyu oyobi Foruga-misaki no shinsohyo no knozo, soshiki ni tsuite], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.99-108, In Japanese. 7 refs.

General core analyses were conducted since 1970 under an Australia-Japan Cooperative Project, to clarify the vertical structure of the Ice Shelf and Wilkes Dome in conjunction with the ice flow of the Shelf and Dome. A number of thin sections were prepared, and grain size and shape, crystallographic orientations, lineation and foliation of air bubbles as well as ice grains and dirt layers, and chemical impurities such as Na, K, Mg and Ca were measured by the use of the sections. These analyses also showed that the Amery Ice Shelf consists of three layers of different origin, which are called as Top, Middle and Bottom layers. The Top layer is formed by the *in situ* accumulation of snow on Ice Shelf, the Middle layer is glacier ice nourished by Lambert Glacier originating from the Antarctic Ice Sheet, and the Bottom layer is developed by the freezing of sea water at the bottom surface.

F-30368

Nakawo, M., Tanaka, H., **On the orientational distribution of the c-axis of ice crystals in core samples** [Higashi Nankyoku, heito hyoga no boringu koa no kessho shujiku hoi bunpu ni tsuite], Kyokuchi hyoshohyo no butsuriteki kagakuteki kenkyu (Physical and chemical studies on ice from glaciers and ice sheets) edited by D. Kuroiwa, Sapporo, Hokkaido University, Mar. 1974, p.109-113, In Japanese. 6 refs.

Fabric studies have been made using core samples from Heito Glacier, a small glacier near Showa Station. The fabric pattern changed periodically, with increasing depth, between the single maximum pattern and the two maxima pattern. This variation of the orientational distribution of c-axis corresponded well with a periodical change in grain size of ice crystals. The orientation of the maxima of these fabric patterns was either orthogonal to the bubble foliation or parallel to the direction of bubble elongation.

F-30375

Dreschhoff, G.A.M., Zeller, E.J., Parker, B.C., **Past solar activity variation reflected in nitrate concentrations in antarctic ice,** Weather and climate responses to solar variations, edited by B.M. McCormac, Boulder, Colorado Associated University Press, 1983, p.225-236, 12 refs.

DLC QC883.2.S6W43 1983

Recently completed studies have demonstrated that nitrate in dated sequences from the interior of the Antarctic ice sheet reflect the level of solar activity occurring at the time of deposition of the snow. Both large-scale solar variability and smaller scale cyclicity are apparent in these records. The firn sequence from the last 200 years clearly shows the 11- and 22-year solar cycle. Examination of replicate samples and sequences has aided greatly in defining sources of contamination and eliminating many of the problems encountered in the earlier studies. The lateral consistency of the nitrate record was also investigated and statistical analysis shows that significant correlations can be obtained over distances ranging from a few meters to several kilometers. (Auth.)

F-30376

Laird, C.M., **Solar particle flux and nitrate in South Pole snow,** Weather and climate responses to solar variations, edited by B.M. McCormac, Boulder, Colorado Associated University Press, 1983, p.237-242, 10 refs.

DLC QC883.2.S6W43 1983

Annual nitrate deposition in snow and firn layers from a glaciological pit at the South Pole covering 51 years has been found to exhibit a significant linear relationship with sunspot numbers, the "aa" index of geomagnetic activty, and most recently a 17-year time series of integral charged particle flux from satellite measurements. Solar cosmic rays and the solar wind offer an explanation of these results. This study may provide a technique for extending the record of solar activity at high resolution thousands of years into the past, and may help in understanding factors controlling long term solar activity and its possible relationship with weather and climate. (Auth.)

F-30379

Bolzan, J.F., **Ice dynamics at Dome C, East Antarctica,** *Ohio. State University. Institute of Polar Studies. Report,* 1984 No.85, 55p., Refs. p.53-55.

An analysis of an 800 meter temperature profile measured at Dome C, East Antarctica is described. An ice sheet model is outlined for which the heat equation is solved numerically. Surface boundary conditions are specified in terms of an interpretation of the Dome C oxygen isotope profile, while basal conditions are related to radio-echo sounding data. Two different classes of functions are considered for the longitudinal strain rate, both consisting of simple polynomials that can be characterized by a single parameter. Temperature profiles generated by each function are compared with the measured profile, showing that the vertical velocity decreases rapidly with depth in the upper half of the ice sheet. The corresponding depth-age relation suggests that ice at 1400 m depth could be as old as 80,000 to 90,000 years. (Auth.)

F-30380

Palais, J.M., **Snow stratigraphic investigations at Dome C Antarctica: A study of depositional and diagenetic processes,** *Ohio. State University. Institute of Polar Studies. Report,* 1984 No.78, 121p., Refs. p.61-66.

Evidence from snow pit studies made at Dome C suggests that a major part of the depositional features are preserved with depth. Visible annual strata are composed of thin hard crusts overlying thicker layers of soft to medium hard snow. Depth hoar-like low density layers, when they occur, are most often found below the thin hard crusts. Cycles in the concentration of gross Beta radioactivity and microparticles occur and can be accurately dated when studied in conjunction with a detailed record of the visible stratigraphy. Accumulation stake measurements of annual layers at Dome C support the belief that depositional processes can account for a major part of the stratigraphic record. Strong near surface temperature gradients and the associated effects of thermal conduction, vapor diffusion and air convection contribute to the development of depth hoar and with time may lead to significant changes in the variations in hardness, density, grain size and possibly impurity concentration and total mass preserved in individual layers. (Auth.)

F-30399

Palais, J.M., Delmas, R., Briat, M., Jouzel, J., **Liquid conductivity of a 44-meter firn core, McMurdo Ice Shelf,** *Antarctic journal of the United States,* 1983 18(5), p.106-107, 5 refs.

To investigate the potential for obtaining a volcanic record from Mount Erebus in the area of Windless Bight, a study was made of a firn core drilled on the McMurdo Ice Shelf. Although a volcanic record was not obtained from the core, a record of impurity concentration variations at the site for the last 100 years was obtained. Continuous profiles of liquid conductivity and deuterium down to 44 m were obtained for the core. A few samples were also measured for sulfate, nitrate, and sodium. It is concluded from the results that in coastal sites such as the McMurdo Ice Shelf location, conductivity variations can be interpreted as seasonal variations of marine salts and can be used to date cores and to estimate accumulation rates. The origin of substantial excess sulfate at this site is as yet unclear.

F-30400

Grootes, P.M., Stuiver, M., **Ross Ice Shelf oxygen isotope profile at J-9,** *Antarctic journal of the United States,* 1983 18(5), p.107-109, 14 refs.

The Ross Ice Shelf oxygen isotope profile at J-9 shows three (and possibly four) regions of differing *delta* O-18 trends. From 35 to 274 m depth increasingly negative *delta* O-18 values (-28.5 per mille to -36 per mille) reflect an origin of the ice as precipitation that fell during the Holocene on the Ross Ice Shelf, Ice Stream B and finally in the catchment area of Ice Stream B. A sharp drop in *delta* O-18 to -43 per mille from 274 to 281 m depth indicates the transition from Holocene to Last Glacial. Below this *delta* O-18 is essentially independent of depth at about -42 per mille.

F-30401

Palais, J.M., Kyle, P.R., Delmas, R., **Detailed studies of tephra layers in the Byrd Station ice core: Preliminary results and interpretation,** *Antarctic journal of the United States,* 1983 18(5), p.109-110, 7 refs.

This paper reports on some new analyses of the ice chemistry of the Byrd Station ice core, and on the composition and morphology of particles of some of the dust layers. New data on several of the ash layers are also presented. Acidity, conductivity, sulfate, nitrate, sodium, and aluminum were measured and their correlations with acidity and dust layers in the core are discussed. The results indicate an important background component of excess sulfate at Byrd Station as well as a sporadic volcanic contribution associated with the dust layers. Preliminary studies of the samples show distinct differences in size, morphology, and surface chemistry of the particles from ash and dust layers. It is suggested that the ash layers were formed during normal subaerial eruptive activity while the dust layers were formed in subglacial volcanic eruptions. The study of dust and ash layers in ice cores may provide information on thickness changes and thus the stability of the west antarctic ice sheet.

F-30402

Fireman, E.L., **Radioactive dating of Byrd core and Allan Hills ice,** *Antarctic journal of the United States,* 1983 18(5), p.111, 6 refs.

Two radioactive dating methods have been applied to the Byrd core and Allan Hills ice: C-14 and uranium series dating. The oldest C-14 date for a Byrd core sample was 8,900 years. In the Allan Hills, the oldest C-14 age, 10,500 years was for subsurface ice from the cul de sac region. Subsurface ice from other Allan Hills regions gave ages about 6,000 years. The procedure for uranium series dating is described. An uncorrected radium-226/thorium-230 recoil age of 40,000 years was obtained for a near bottom Byrd sample; however this age must be corrected for the dissolved components and the disequilibrium in the dust. The correction factors are being determined.

F-30403

Mayewski, P.A., **Ice mass fluctuations in northern Victoria Land,** *Antarctic journal of the United States,* 1983 18(5), p.112, 3 refs.

The primary controls on the activity of Rennick Glacier and others in this region are mass balance and sea-level. Results of the field study to date indicate that the upper Rennick Glacier and others in this region are mass balance and sea-level. Results of the field study to date indicate that the upper Rennick Glacier region is characterized by glacio-depositional and erosional features associated with wet-based ice, surface water flow, ablation rates more intense than in more southerly areas of the Transantarctic Mountains, and marked thinning of ice in its catchment area. The thinning may lead to a dramatic decrease in the volume of ice entering Rennick Glacier and further inland migration of its grounding line.

F-30404

Kuivinen, K.C., **237-meter ice core from South Pole station,** *Antarctic journal of the United States,* 1983 18(5), p.113-114, 5 refs.

The Polar Ice Coring Office (PICO) used its new intermediate-depth drill system to collect a 237 m ice core at Amundsen-Scott Station during Nov.-Dec. 1982. The core will be analyzed for microparticle concentrations, oxygen isotopes, carbon dioxide, beryllium-10, chlorine-36, and acidity by Ohio State University, the University of Washington, and the University of Bern, Switzerland. The core was split, sampled and packaged for retrograde shipping to the various investigators' laboratories in a subsurface science trench excavated adjacent to the drill platform. The drill, designed for continuous coring in firn and ice to a maximum depth of 600 m, and its operation are described. Drilling was stopped at 237 m due to problems with the head and bit configuration. The designs will be revised to include self-stabilizing bits. Tests were conducted at South Pole Station on a solar-powered coring auger. The performance exceeded results from Greenland in July 1982.

F-30405

Stauffer, B., Schwander, J., **Core processing and analyses of ice cores drilled at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.114-116, 2 refs.

The main scientific goals of this project are to reconstruct the histories of atmospheric CO2 and solar activity, and measure the acidity of ice cores, which gives information on past volcanic activity. During the season, ice cores of a total length of 103 m drilled in 1980-81 and 120 m (from a depth of 106 to 227 m below surface) drilled in 1982-83 were processed. To set up a processing line, a trench 3 m deep, 3.5 m wide, and 14 m long was excavated next to the drilling site. The core processing procedure is shown schematically. Acidity, measured by electrodes, was higher at the beginning of a long-lasting snow, in summer, and after volcanic eruptions. The signal of seasonal variations seems to be small at the South Pole, but signals from large volcanic eruptions are clearly visible. A value of about 265 parts per million is estimated for the preindustrial atmospheric CO2 concentration.

F-30406

Mosley-Thompson, E., **South Pole pit stratigraphic studies,** *Antarctic journal of the United States,* 1983 18(5), p.116-118, 5 refs.

Kruss, P.D. During Nov. and Dec. 1982 four pits were excavated, by hand, at Amundsen-Scott Station. Bain, T. Pit walls were mapped and a clean vertical face was exposed for sample collection. A table summarizes the samples collected and measurements in each pit. In conjunction with each pit, a shallow core was extracted using the PICO lightweight hand auger. The cores and the samples from the pit walls will be measured for the following parameters: concentration and size distribution of microparticles, beta radioactivity, and delta oxygen-18 analyses. When the analyses are completed the data will allow assessment of the seasonal deposition and preservation of these parameters within the firn, their spatial and temporal variability over the last 12 years. Information from Pit 4 compared with 4 years of accumulation measurements indicates the formation of a sequence of three mass loss or depth hoar layers between the fall of 1980 and the fall of 1981. These sequences have been interpreted as indicators of missing years.

F-30407

Mosley-Thompson, E., Thompson, L.G., **South Pole ice core processing and microparticle analysis,** *Antarctic journal of the United States,* 1983 18(5), p.118-119, 8 refs.

Ice cores from Antarctica and Greenland have provided a broad spectrum of information about the global climate system particularly the characteristics of the atmosphere during the past. In order to further investigate the relationships between particle concentrations in ice cores and past events, i.e., global temperatures, radiation balance, volcanic events, etc. another South Pole ice core was extracted. The core is being examined at Amundsen-Scott Station by scientists from Ohio State University, the University of washington, and the University of Bern, in conjunction with personnel of the Polar Ice Coring Office. A science trench (3 m deep, 3.5 m wide, 14 m long) was excavated beside the drilling platform and equipment for ice core processing and analyses was installed in the trench. Studies being conducted on the core are outlined.

F-30410

Govoni, J.W., Ackley, S.F., Holt, E.T., **Surface roughness of Ross Sea pack ice,** *Antarctic journal of the United States,* MP 1764, 1983 18(5), p.123-124, 5 refs.

At the end of the 1980 austral winter, sea-ice surface roughness was assessed along selected tracks in the Ross Sea. The ice surveyed consisted mainly of first-year pack ice. Surface profiles were made using a Spectra-Physics Geodolite 3A laser profilometer which was mounted vertically in the camera bay of a National Science Foundation LC-130 aircraft. The profilometer, recording equipment and measurement technique are described. For the data analyzed to date, the Ross Sea region appears in general to have much less ridging than either the Weddell Sea or the Arctic Basin. The open nature of the boundaries here leads to generally divergent conditions and diminishes the stress transmitted through the pack ice resulting in fewer high ridges. Near coastal boundaries, however, localized high stress may exist and ridging features develop accordingly.

F-30419

Knight, C.A., DeVries, A.L., Oolman, L.D., **Fish antifreeze protein and the freezing and recrystallization of ice,** *Nature,* March 15-21, 1984 308(5956), p.295-296, 17 refs.

Antifreeze glycopeptides and peptides from the blood of polar fishes prevent the growth of ice crystals in water at temperatures down to about 1 C below freezing point, but do not appreciably influence the equilibrium freezing point. This freezing point hysteresis must be a disequilibrium effect, or it would violate Gibbs' phase rule, but the separate freezing and melting points are experimentally very definite: ice neither melts nor freezes perceptibly within the "hysteresis gap", for periods of hours or days. Unusual crystal faces on ice crystals grown from solutions of very low concentrations of the antifreeze glycopeptides and peptides are reported. This is a clue to the mechanism of freezing inhibition, and it may be the basis of a simple, very sensitive test for antifreeze material. Very low concentrations of the antifreeze protein are also remarkably effective in preventing the recrystallization of ice. (Auth.)

F-30425
Denton, G.H., Prentice, M.L., Kellogg, D.E., Kellogg, T.B., **Late Tertiary history of the antarctic ice sheet: Evidence from the Dry Valleys,** *Geology,* May 1984 12(5), p.263-267, 16 refs.

Data from Dry Valleys suggest that outlet glaciers of a local ice cap carved primary valley systems on both flanks of the Transantarctic Mountains, while coeval alpine glaciers eroded exposed intervalley mountain ranges. Subsequently, a thick ice sheet overrode the Transantarctic Mountains at least twice, flowing northeastward across major pre-existing valleys. The youngest overriding episode postdated and the older episode antedated middle to early late Miocene time. It is proposed that an extensive ice sheet covered East and West Antarctica during overriding episodes. (Auth.)

F-30437
Lingle, C.S., **Numerical model of interactions between a polar ice stream, the ocean and the solid Earth: application to ice stream E, West Antarctica,** Madison, University of Wisconsin, 1983, 165p., University Microfilms order No. 83-23387, Ph.D. thesis. Refs. p.155-165.

A time-dependent numerical model was developed to study the dynamics of the polar ice stream E, which drains the Marie Byrd Land slope of the west antarctic ice sheet, and flows between Roosevelt Island and Shirase Coast to the calving front of the Ross Ice Shelf. Results show that the grounding line of ice stream E is close to dynamic equilibrium, neither advancing nor retreating rapidly, if the ice stream and its catchment area are approximately in mass balance. The model was also used to simulate Holocene retreat of the ice stream from the edge of the continental shelf in the Ross Sea on rigid, elastic and viscoelastic earth models. Rising eustatic sea level acted as a forcing function which initiated retreat from the edge of the continental shelf. The assumed retreat history of the calving front of the Ross Ice Shelf was found to exert dominant influence on the computed timing of grounding-line retreat. (Auth. mod.)

F-30450
Hebert, D., **Tritium in antarctic precipitation—information on global distribution,** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.7-22, 25 refs.

The secular variation in the tritium content of precipitation, particularly in the polar regions is investigated by mathematical treatment of a compartment model of exchangeable atmospheric reservoirs. Exchange coefficients are calculated to be 0.35/year and 0.18 year for interstratospheric exchange and exchange between stratosphere and troposphere, respectively. The tritium altitude effect and a special Antarctic continental effect are discussed. (Auth.)

F-30478
Symposium on Ice and Climate Modelling, Evanston, IL, June 27-July 1, 1983, **Proceedings,** *Annals of glaciology,* 1984 Vol.5, 243p., Refs. passim. For individual papers see 39-163 through 39-197 or F-30479 through F-30485.

The symposium brought glaciologists into direct contact with modelers of the Earth's climates during interglacials (such as the present) and glacial episodes. The purpose of mutual familiarization was served by reviews of the hierarchies which now exist for models of atmosphere, ocean, and climate. These reviews emphasized the actual or potential uses of ice data and parameterizations, and both general and specific aspects of coupling and sensitivity testing. The glaciologists in their turn reviewed the problems of exploring different ice forms and simulating their responses to climatic forcing. The most significant results concerned atmospheric concentrations of carbon dioxide deduced from ice core analyses. Topics recommended for priority attention include contemporaneous changes in the properties of ice cores from Greenland and Antarctica, links between weather sequences and the stable isotope contents of polar precipitation, systematic intercomparisons of a wide range of model results, and the construction of intermediate-complexity sea-ice models for use in climate simulations. The volume includes 35 papers given in full and abstracts of an additional 31 papers.

F-30479
Budd, W.F., Jenssen, D., Smith. I.N., **A three-dimensional time-dependent model of the West Antarctic ice sheet,** *Annals of glaciology,* 1984 Vol.5, p.29-36, 33 refs.

The area of West Antarctica which drains into the Ross Ice Shelf is examined for the purpose of understanding its dynamics and developing a numerical model to study its reaction to environmental changes. A high resolution 20 km grid is used to compile a database for surface and bedrock elevation, accumulation, and surface temperatures. Balance velocities are computed and found to approximate observed velocities. (Auth.)

F-30480
Doake, C.S.M., **Ice-shelf densities from a comparison of radio echo and seismic soundings,** *Annals of glaciology,* 1984 Vol.5, p.47-50, 11 refs.

A 40 km line across George VI Ice Shelf was sounded in January 1981 by both radio echo and seismic reflection methods. Because the velocities of radio and seismic waves vary with ice density in different ways, an accurate comparison of travel times from the two methods allowed the average density of the ice shelf to be calculated. A distinguishable echo from the base of the ice shelf was recorded at 22 out of 23 seismic stations. Continuous radio echo profiling was achieved in ice varying in thickness from about 200 to 350 m. The calculated mean densities fell into two groups. In an area where summer meltwater frequently floods the surface the average densities were around 0.915 Mg/cu m while in the drier areas the average densities were around 0.884 Mg/cu m. Apart from this division, there was no apparent systematic variation of average density with position. The sounding was carried out approximately along a flowline on the ice shelf. The variation of ice density with depth and position is difficult to allow for when modelling the deformation of ice shelves. Measured values of surface strain-rate, for example, may in some circumstances need to be corrected for effects due to the compressibility of snow. (Auth.)

F-30482
McInnes, B.J., Budd, W.F., **Cross-sectional model for West Antarctica,** *Annals of glaciology,* 1984 Vol.5, p.95-99, 24 refs.

The dynamic state of the west antarctic ice sheet has been termed the grand problem of glaciology. An attempt is made to assess it by simulating the observed ice thickness and ice velocities along a cross-section from ice stream B (Ross Sea) to Pine Island Glacier (Pine Island Bay) with a numerical model developed from the one described by Budd and McInnes (1978). A kinematic analysis with topographical and regime data from various sources shows the mass fluxes observed near the grounding line of the Ross Ice Shelf to be of the order expected for steady-state balance. Deformation of the ice accounts for only a small fraction of the observed flow there. Simulations with the Budd/McInnes surging mechanism can approximate the existing ice thickness as a post-surge feature but fail to reproduce the high balance velocities. Both these velocities and the existing ice-thickness profile are simulated successfully as a state of steady sliding, with parameterizations involving the ice thickness above that corresponding to buoyancy and realistically assumed longitudinal strain-rates. A range of results is presented to illustrate the sensitivity of the simulation to changes in various parameters. (Auth.)

F-30483

Stephenson, S.N., **Glacier flexure and the position of grounding lines: measurements by tiltmeter on Rutford Ice Stream, Antarctica,** *Annals of glaciology,* 1984 Vol.5, p.165-169, 14 refs.

Two methods were used to locate the grounding line on the Rutford Ice Stream. The first method determined where the glacier was floating in hydrostatic equilibrium, while the second method measured the flexing close to the grounding line due to ocean tides. The ratio of surface elevation to ice thickness of the glacier goes through the hydrostatic equilibrium value 1 to 2 km downstream of where tidal flexing was recorded. This behaviour can be explained if the upward pressure of the sea at the base of the ice is augmented by a vertical shear-stress gradient within the glacier to overcome its weight. Simple elastic-beam theory matches the flexure profile data if a modified elastic modulus and effective thickness are used. Tiltmeters can be used to monitor the position of the grounding line if the geometry of the flexing region can be defined. (Auth.)

F-30484

Warren, S.G., **Impurities in snow: effects on albedo and snowmelt (review),** *Annals of glaciology,* 1984 Vol.5, p.177-179, 20 refs.

Very small (ppm) amounts of soil dust in snow can significantly reduce snow albedo and thereby affect the snow-surface energy budget. Ice cores from Greenland show enhanced dust concentrations in ice from the last glacial maximum, in amounts capable of causing measurable effects on snow albedo. This enhanced dust is probably due in part to the expanded desert areas at that time. Volcanic ash layers visible in the Byrd Station core reduced the snow albedo in West Antarctica when they were on the surface. The ash is unlikely to have had a long-term effect on albedo because of the episodic nature of volcanic eruptions. Very large amounts of dust on snow can inhibit snow-melt by insulating the snow. A debris cover probably slowed the melting of parts of the North American ice sheet during its most recent decay phase. Snow in the Arctic Ocean is presently suffering large-scale contamination by carbon soot from anthropogenic sources. Preliminary estimates indicate that soot concentrations in Arctic snow are sufficient to reduce snow albedo measurably.

F-30485

Zwally, H.J., **Observing polar-ice variability,** *Annals of glaciology,* 1984 Vol.5, p.191-198, 36 refs.

The repetitive synoptic ice data obtainable by satellite sensing provide a means of studying the time-dependent behavior of both sea ice and ice sheets from the Arctic and Antarctic on climatic time scales. Examples of sea-ice parameters which may be measured are extent, concentration, and multiyear fraction; and examples of ice-sheet/ice-shelf parameters are surface elevation, ice-front position, extent and duration of summer melting, and ice accumulation rates. Desired snow-cover parameters include extent and snow depth or water-equivalent depth. The unique ability of satellites to measure such ice parameters and the characteristics of the consequent data sets significantly influence the structure of ice models that can be successfully used with the data. Ice data sets recently acquired by satellite sensing are described. The past decade of sea-ice data provides a detailed description of the interannual variability of sea ice on a regional and seasonal basis. Because of the longer time scales involved in ice-sheet variations, a comparable record of ongoing ice-sheet variations has not yet been established, but important baseline data sets are being developed.

F-30486

Ohtomo, M., Wakahama, G., **Correlation between crystallographic axes and the shape of single crystal in glaciers,** *Journal of glaciology,* 1983 29(103), p.498-504, With French and German summaries. 8 refs.

Studies were made of the correlation between the crystallographic axes and the shape of an individual single crystal of a crystalline aggregate in a temperate glacier and an Antarctic deep core, both of which have the typical fabric pattern of the four-maxima type, by approximating the crystal shape to an ellipsoid and then measuring misorientations between the axes of the ellipsoid and the crystallographic axes of the crystal. The result shows that the crystallographic axes are correlated with the axes of the ellipsoid; that is, in most cases the longest and the shortest axis of the ellipsoid are coincident with one of the a-axes and the c-axis of a crystal, respectively.

F-30487

Comiso, J.C., Zwally, H.J., **Concentration gradients and growth/decay characteristics of the seasonal sea ice cover,** *Journal of geophysical research,* Sep. 20, 1984 89(C5), p.8081-8103, 42 refs.

The growth and decay characteristics of sea ice in the northern and southern hemispheres are presented quantitatively by using brightness temperature data from the Nimbus 5 Electrically Scanning Microwave Radiometer. The areal extent of ice cover follows a basically symmetrical seasonal cycle in the northern hemisphere, while the seasonal cycle in the southern hemisphere is asymmetrical, with longer periods of growth than decay. At different longitudes the occurrences of the maximum rates of advance of the ice edge differ by up to 2 months, and similarly for retreat. For some months, rates as large as a 940-km/month change in the latitudinal position are observed when the movement of the ice edge tends to be in the eastward or westward direction as, for example, in the Weddell Sea. The gradient of ice concentration near the ice edge has considerable variability. During the growth cycle, the dominant change in ice cover is the advance of consolidated ice behind the advancing ice edge, while during decay the retreat of the ice edge is accompanied by massive reduction of ice concentration within the ice pack. The monthly changes in ice edge position in the southern hemisphere are also shown to have good correlation with the rates of advance and retreat of the 271 K surface temperature isotherms inferred from climatological temperature data. (Auth. mod.)

F-30488

Stockton, W.L., DeLaca, T.E., DeNiro, M.J., **Stable isotope analysis of a submarine ice cliff at Explorers Cove, McMurdo Sound, Antarctica,** *Journal of glaciology,* 1984 30(104), p.112-115, 13 refs., With French and German summaries.

Stable isotope ratios and salinities of ice samples obtained from a submarine ice cliff at Explorers Cove demonstrate that the upper parts of the ice cliff have frozen directly from sea-water and are an underwater expression of permafrost, whereas the lower parts appear to be partially glacial in origin. These results indicate that there may be ice cores in the moraines of Explorers Cove, in which case the coastline of McMurdo Sound is more extensively ice-cored than previously known.

F-30503

Lingle, C.S., **Numerical model of interactions between a polar ice stream and the ocean: application to Ice Stream E, West Antarctica,** *Journal of geophysical research,* May 20, 1984 89(C3), p.3523-3549, Numerous refs.

A time-dependent numerical model has been developed to study the dynamics of a polar ice stream grounded below sea level. The retarding force, or back stress, from the floating Ross Ice Shelf needed to hold the model grounding line in dynamic equilibrium was found to compare closely with retarding force mapped from field data by earlier investigators. This implies that the grounding line of ice stream E is in fact close to dynamic equilibrium, neither advancing nor retreating rapidly, if the ice stream and its catchment area are approximately in mass balance. Sensitivity tests showed that the model ice stream is more sensitive to changes in back stress from the ice shelf than to changes in the accumulation rate. Changes in back stress can be caused by changes in the average thickness of the ice shelf. The model was used to simulate retreat of the ice stream from the edge of the continental shelf in the Ross Sea during the Holocene period of rising sea level. The sea-floor was assumed to be isostatically depressed but to remain rigid during retreat. The effect of the assumed retreat history of the Ross Ice Shelf on the computed timing of grounding-line retreat was investigated by considering several alternative ice shelf histories. (Auth. mod.)

F-30513

Keys, J.R., **Iceberg quantities, shapes, and sizes in western Ross and D'Urville Seas,** *Antarctic journal of the United States,* 1983 18(5), p.125-127, 13 refs.

Iceberg counts were made in the southern ocean and western Ross Sea during the cruise of *Glacier* from Christchurch to McMurdo in Jan. 1983 and the return cruise in Feb., and from the yacht *Dick Smith Explorer* heading south from Hobart, Australia, in the southern ocean and D'Urville Sea during Jan. 1982. Radar was used as the basic tool for estimating iceberg quantities, which vary widely in space and time. It was concluded that the southwest and west areas of Ross Sea contain more icebergs on average than elsewhere in the Ross Sea. Irregular shaped and rounded icebergs (mainly those that have overturned) are more numerous collectively than non-overturned icebergs in the southern ocean. However, within the Ross Sea, non-overturned icebergs may be more numerous. Also, crevassed tabularform icebergs are more numerous in the D'Urville Sea than in the Ross Sea. The smallest icebergs (less than 200 m long) seemed to be the most common in both seas. The maximum draft of icebergs in the Ross Sea is probably greater than 300 m.

F-30514

Kumai, M., Ackley, S.F., Clarke, D.B., **Elemental compositions and concentrations of microspherules in snow and pack ice from the Weddell Sea,** *Antarctic journal of the United States,* MP 1777, 1983 18(5), p.128-131, 7 refs.

This paper presents the results of an investigation of microspherules found in snow and pack ice from the Weddell Sea, Antarctica, collected during the U.S.-U.S.S.R. Weddell Polynya Expedition, 1981. Elemental composition, size, and concentration of microspherules were determined using a scanning electron microscope (SEM) and energy dispersive X-ray analysis (EDXA). Typical textures of microspherules are shown in this report and compared with those found in snow and ice-fog crystals sampled from the Northern Hemisphere. In this study, 23 microspherules were found in the snow sample from the Weddell Sea and 6 from the snow-ice sample. The concentration of microspherules in the snow samples is calculated to be approx 0.001 percent, three orders of magnitude smaller than that of the Northern Hemisphere. This indicates that the concentration of microspherules in the Antarctic may be three orders of magnitude smaller than the concentration found in the Northern Hemisphere. Silicon- and titanium-rich microspherules from the Weddell Sea were found in fly ash of terrestrial origin. The iron rich microspherules were tentatively identified to be of extraterrestrial origin.

F-30567

Lile, R.C., **Flow law for isotropic and anisotropic ice at low strain rates,** *Australian National Antarctic Research Expeditions. ANARE reports,* 1984 No.132, 93p., Refs. p.89-93.

One of the weakest links in present ice dynamics models is the lack of an adequate empirical flow law for polycrystalline ice in its natural state. Inadequacies include a paucity of creep data relevant to cold ice masses and a general neglect of the effects of preferred crystal orientation fabrics. The present study reports the results of 150,000 hours of creep tests on isotropic aggregates replicating conditions of temperature and shear stress relevant to polar ice masses, from which an extended isotropic flow law has been constructed. The quantitative model developed for this purpose is made possible by: (a) the definition of a normalised third deviatoric stress invariant as a configuration parameter describing the geometrical distribution of shear stress and (b) a reinterpretation of the scalar geometric factor employed in the analysis of monocrystalline creep as a tensor coefficient of correlation between the orientation fabric and the stress configuration parameter. Laboratory experiments are presented to substantiate the validity of the model. (Auth.)

F-30568

Ackley, S.F., Smith, S.J., **Reports of the U.S.-U.S.S.R. Weddell Polynya Expedition, October-November 1981, Volume 5, Sea ice observations,** *U.S. Army Cold Regions Research and Engineering Laboratory,* SR 83-2, Jan. 1983 6p. + 59p., ADA-130 140, 4 refs.

Sea ice conditions are presented in several formats. These include an ice conditions map prepared by the ship's meteorological crew, a narrative ice log supplemented by photographs taken by one of the authors, and daily satellite photographs. These are presented in a format compiling each day's conditions on one or two pages. These observations are being correlated with other satellite-based estimates of ice conditions, and with other oceanographic and meteorological measurements made during the expedition. (Auth.)

F-30569

Ackley, S.F., Holt, E.T., **Sea ice data buoys in the Weddell Sea,** *U.S. Army Cold Regions Research and Engineering Laboratory,* CR 84-11, May 1984 18p., ADA-144 953, 6 refs.

Data obtained from two sets of data buoys either air-dropped or deployed by ship onto the Weddell Sea pack ice during the period from Dec 1978 to Nov 1980 are presented. The buoy data include position, pressure and temperature information and to date represent the most complete combined weather and pack ice drift records for the ice-covered southern ocean regions. The buoys tended to drift north initially and then to turn east generally between latitudes 62 S and 64 S. Buoy 1433 turned east farther south at approximately 67 S but at about the same time as buoy 0527, implying that the westerly wind belt was farther south than usual in 1979. The range of air pressures—from about 950 mb to about 1020 mb—is typical of the circumpolar low pressure trough in the Southern Hemisphere. All buoys were equipped with an internal or compartment temperature sensor. The buoys also contained an external air temperature sensor in a ventilated, shielded can at 1-m height. Although differences of 10 C or more between recorded air and compartment temperatures are common, the correlation between the two measured temperatures is generally very good. The compartment temperatures are higher probably because the buoy is radiationally heated. We found that subtracting 3 C from the average daily compartment temperature yielded a good estimate of the average air temperature for any given day. This technique can be used to construct average daily air temperature records for the 1979 buoys which only contained the internal or compartment temperature sensor.

F-30570

Cragin, J.H., Giovinetto, M.B., Gow, A.J., **Baseline acidity of ancient precipitation from the South Pole,** *U.S. Army Cold Regions Research and Engineering Laboratory,* CR 84-15, June 1984 7p., ADA-145 007, 33 refs.

Measurements of meltwater pH from annual layers of South Pole firn and ice samples ranging in age from 40 to 2000 years B.P. show that precipitation at this remote site has a higher natural acidity than that expected from atmospheric equilibrium with CO2. The average pH of deaerated (CO2-free) samples was 5.64, while air-equilibrated samples averaged 5.37, a pH that is about a factor of two more acidic than the expected background pH of 5.65. The observed "excess" acidity can be accounted for by natural SO4 and NO3 ion levels in the samples probably originating from non-anthropogenic H2SO4 and HNO3. Because of the presence of these naturally occurring acids in South Pole precipitation, a pH of 5.4 is considered a more representative baseline reference pH for acid precipitation studies.

F-30577

Russell-Head, D.S., Budd, W.F., Moore, P.J., **Compacted snow as a pavement material for runway construction,** *Cold regions science and technology,* Aug. 1984 9(3), p.231-247, 17 refs.

An analysis of snow compaction and hardness has been carried out to assess the prospects for preparation of a compacted snow runway for wheeled aircraft on Law Dome near Casey, Antarctica. Snow which successfully duplicates the in situ surface snow on the Law Dome has been made in the laboratory. Compaction, unconfined compression and California Bearing Ratio (CBR) tests have been performed on this laboratory-made snow. The CBR value of compacted snow depends strongly on its density. A pavement CBR value of not less than 10 is required by a wheeled C130 aircraft and this was achieved at a snow density of 0.6 Mg/cu m. The CBR strength of compressed snow increased with time after compaction. The temperature of the compacted snow did not influence the CBR strength of the snow as strongly as the density. However, snow is more easily compacted to high densities at higher temperatures. The pavement thickness required for C130 operation depends on the pavement CBR, the subgrade CBR and the acceptable wheel settlement. Calculations indicate that for a wheel settlement of 20 mm, a pavement CBR of 10 and a subgrade CBR of 3, a minimum pavement thickness of about 0.5 m is required. (Auth. mod.)

F-30595

Wolff, E.W., Paren, J.G., **Two-phase model of electrical conduction in polar ice sheets,** *Journal of geophysical research,* Oct. 10, 1984 89(B11), p.9433-9438, 43 refs.

It has been suggested that the dc conductivity of polar ice sheets could be due to the presence of liquid layers at the grain boundaries. These layers would consist of a mixture of acids with water. We show that it is plausible that acids will be at three-grain boundaries in polar ice. Using reliable data for H2SO4, HNO3, and HCl concentrations in ice at South Pole, we derive the correct magnitude and temperature dependence for its conductivity. The model explains the narrow range of ice conductivities found in polar regions. (Auth.)

F-30639

Kotliakov, V.M., **Developments in antarctic glaciology,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.137-154, TT 79-52012, For Russian original see 10F-21695 or 33-3621. 15 refs.

Antarctic glaciology in the last 10 years is reviewed. During this time there has been a shift from complex studies carried out by individual countries to international projects. The article discusses the major one: International Antarctic Glaciological Project—its aims, the area under study, methodology, the Soviet role, and main results to date. The disposal of radioactive waste by burying it in Antarctica is considered but rejected. Antarctic mass balance is estimated and some problems affecting precision of such estimates are discussed. The possibilities either of catastrophic collapse of the West Antarctic ice sheet or of massive surges are touched upon. Suggestions for futher glaciological research in Antarctica are offered. (Auth. mod.)

F-30640

Bardin, V.I., **Problem of the paleoglaciology of Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.155-164, TT 79-52012, For Russian original see 10F-21696 or 33-3622. 28 refs.

The results of paleoglaciological research in Antarctica are reviewed. Studies of the complex of moraines of various ages in Victoria Land, Dronning Maud Land and Mac. Robertson Land have shown definite similarities in main glacial events among these regions and have proved that the East Antarctic ice sheet, at least after it reached its fullest extent, developed as one entity and underwent three great cyclical oscillations. Comparative lithological and morphological descriptions of moraines and glacial sediment dating have led to a correlation of the glacial events in various parts of Antarctica and to an understanding of the general course of East Antarctic Cenozoic glaciation. (Auth. mod.)

F-30671

Drewry, D.J., **Ice sheets on the move,** *Geographical magazine,* July 1984 56(7), p.356-361.

A review is given of the history of modern glaciology since about 1840 when certain geological features such as moraines and polished rock surfaces were first interpreted as resulting from glacier action. Development of studies on the relationships between ice sheets and the atmosphere is outlined and models of the growth of ice sheets are explained in text and flow diagrams. Examples over the last 150,000 to 200,000 years of these mechanisms and how they operate are described in the former Laurentide and present day Antarctic Ice Sheets.

F-30715

Gjessing, Y., **Marine and nonmarine contribution to the chemical composition of snow at the Riiser-Larsenisen Ice Shelf in Antarctica,** *Atmospheric environment,* 1984 18(4), p.825-830, 17 refs.

The distribution with depth of 7 different ions in 3 snow profiles, 1, 60 and 120 km from the coast on Riiser-Larsen Ice Shelf showed a close covariation between ions of marine origin and noncorrelation between these ions and ions of presumptively nonmarine origin. The deposition rates of ions of marine origin varied 50:1 over 120 km distance from the coast. The SO4(2-):Na ratio in snow near the coast was lower than for bulk sea water, indicating a loss of SO4(2-) in snow to the atmosphere by volatilization. (Auth.)

F-30724

Schwander, J., Stauffer, B., **Age difference between polar ice and the air trapped in its bubbles,** *Nature,* Sep. 6, 1984 311(5981), p.45-47, 11 refs.

Air entrapped in bubbles formed in cold ice has essentially the same composition as that of the atmosphere at the time of bubble formation. The analysis of dated ice samples therefore enables the history of atmospheric composition to be investigated. The age of the entrapped air is, however, not the same as that of the surrounding ice because air bubbles only become isolated from the atmosphere during the transition from firn to ice. Typically the age of the ice at this transition is between 100 and 3,000 yr, depending mainly on firn temperature and snow accumulation rate. The mean age difference between ice and enclosed air, as well as the age distribution width for a given sample, are especially important for the investigation of the anthropogenic increase of CO2 and trace gases in the atmosphere over the last centuries, and for the comparison of climatic parameters recorded in the ice with parameters recorded in the bubbles. For Siple Station this age difference and age distribution width were deduced from the bubble volume measured as a function of depth. The values are 95 yr and 22 yr respectively. (Auth.)

F-30731

Orheim, O., **Why are the antarctic icebergs so large** [Hvorfor er de Antarktiske isfjell så store?], *Naturen,* 1978 102(6), p.277-280, In Norwegian.

Arctic icebergs usually are not more than a few hundred meters long, while in the Antarctic icebergs in the hundred square kilometer range are common, and the Trolltunga that calved from Queen Maud Land in 1967 was 5,000 sq km in size. The reason for this is found in the antarctic topography, as explained and illustrated here in a diagram and a photograph.

F-30733

Vinje, T.E., **Where do antarctic icebergs drift** [Hvor driver de antarktiske isfjellene?], *Naturen,* 1978 102(6), p.285-288, In Norwegian.

After a brief history of antarctic iceberg observations, including american satellite observations begun in 1967 and French observations by means of a radio transmitter begun in 1972, the placing of a Norwegian self-positioning transmitter by an American helicopter on an iceberg in the west wind belt of the Weddell Sea is reported. Drift paths of the Trolltunga iceberg and of the icebergs with the French and Norwegian transmitters are shown on a chart.

F-30744

Grosval'd, M.G., **Origin of "inundated shore lines" of glaciated North Atlantic shelves** [O proiskhozhdenii "zatoplennykh beregovykh liniĭ" gliatsial'nykh shel'fov severnoĭ Atlantiki], Kolebaniia urovnia moreĭ i okeanov za 15,000 let. (Sea and ocean level fluctuations for 15,000 years). Edited by P.A. Kaplin, R.K. Klige, and A.L. Chepalyga, Moscow, Nauka, 1982, p.125-133, In Russian. 37 refs.

Recent processes, developing at the boundary between the West Antarctic ice sheet and the floating ice of the Ross Shelf, threw some light on the origin of glacial terraces in the northern Atlantic, which were formed in underwater-subglacial conditions, rather than at sea level, at the overlap-stabilization borders of the "marine" ice sheets. The mechanism of the formation of inundated glacial coastal terraces is described, illustrated and discussed.

F-30761

Kahmann, B., **Current state and trends in antarctic glaciological research** [Zu Stand und Tendenzen der glaziologischen Forschungsarbeiten in der Antarktis], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.52-57, In German with Englis
and German summaries. 18 refs.

The essential research activities of the SCAR nations are listed
a short general review. From the situation and trends of the glac
logical activities in Antarctica in the period from 1979 to 1982 prop
als are deduced for glaciological projects for the next years. (Aut

F-30762

Reppchen, G., **Results of geodetic-glaciological work of**
GDR party of the 23rd SAE on Hays Glacier in Enderb
Land [Ergebnisse der geodätisch-glaziologischen Arbeiten
einer DDR-Gruppe der 23. Sowjetischen Antarktisexpedition (SAE) am Hays-Gletscher, Enderby-Land], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.58-62, In German with English and Russian summaries.

Since 1972, GDR scientists carried out geodetic-glaciologi
measurements at Hays Glacier, near the Soviet main station Mo
dezhnaya. The principal results are as follows: Among the glaci
and ice caps of the West Enderby Land drainage basin (area: 20,0
sq km.), the Hays Glacier forms the most important local draina
basin with about 10,000 sq km. The length of the glacier is estimat
to be about 200-250 km. The maximum width is 60 km. The thi
ness of the ice varies between 500 m (front line) and 2000 m (Inlan
The velocity, being constant in time, increases steadily from the inla
towards the coast. The snow surface at fixed points and the speci
mass budgets are in a steady state along the Hays traverse. (Aut

F-30763

Hebert, D., **C-14 dating of plants and penguin guano in t**
region around Molodezhnaya (Antarctica) and glaciological implications [C-14-Datierung von Pflanzen und Pinguinguano aus dem Gebiet von Molodeshnaja (Antarktika) und daraus ableitbare glaziologische Aussagen], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.64-73, In German with English and Russian summaries. 24 refs.

During the antarctic summers 1975/76 and 1977/78 samples
snow, ice, plants, guano and air-CO2 were collected near Molode
naya Station. Within the investigations of the natural radioactiv
the content of environmental isotopes (e.g. tritium, deuterium, o
gen-18, carbon-13, carbon-14) of these samples was measur
Glaciological implications of the results are discussed. The rec
rate of coastal uplift of Enderby Land is concluded to be 3 centime
per year. (Auth.)

F-30815

Hibler, W.D., III, **Ice dynamics,** *U.S. Army Cold Regions*
Research and Engineering Laboratory, M 84-03, July 198
52p., ADA-147 376, Refs. p.48-52.

This monograph reviews essential aspects of sea ice dynamics
the Arctic and Antarctic on the geophysical scale and discusses t
role of ice dynamics in air-sea-ice interaction. The review is divid
into the following components: a) a discussion of the moment
balance describing ice drift, b) an examination of the nature of sea i
rheology on the geophysical scale, c) an analysis of the relationsh

between ice strength and ice thickness characteristics, and d) a discussion of the role of ice dynamics in the atmosphere-ice-ocean system. Because of the unique, highly nonlinear nature of sea-ice interaction, special attention is given to the ramifications of ice interaction on sea ice motion and deformation. These ramifications are illustrated both by analytic solution and by numerical model results. In addition, the role of ice dynamics in the atmosphere-ice-ocean system is discussed in light of numerical modeling experiments, including a fully coupled ice-ocean model of the Arctic-Greenland-Norwegian seas.

F-30830

Xie, Z., **Studies of ice formation and ice fabric on the Law Dome, Antarctica,** *Journal of glaciology and cryopedology,* Mar. 1984 6(1), p.1-22, 28 refs., In Chinese with English summary.

Snow stratigraphical studies, together with crystallographic and oxygen isotope analyses, have affirmed the existence of a complete range of ice formation zones on the Law Dome, Antarctica. Between the coast and the summit of the Dome the following 6 zones of progression are observed: ablation, infiltration-congelation (superimposed ice), infiltration, cold infiltration-recrystallization, regelation and recrystallization. The distribution of these zones on the Law Dome is asymmetric: the zone boundaries occur at a higher elevation on the west side than on the east side, reflecting the asymmetry in accumulation and thermal conditions. At the very bottom of the borehole the ice contains dirt and moraine particles, and the microtexture shows that in each large crystal, the air bubbles have a preferred orientation in the basal plane. This indicates regelation-recrystallization, as the ice is at pressure melting and basal sliding occurs. Comparisons with borehole inclination and oxygen isotope data show that the two layers of single maximum fabric correspond to two layers of high ice shear and the second layer contains ice dating back to the period of the last glaciation. (Auth. mod.)

F-30831

Thompson, L.G., **Analysis of microparticles in ice cores: an indicator of past environments,** *Journal of glaciology and cryopedology,* Mar. 1984 6(1), p.25-32, 22 refs., In Chinese with English summary.

The dry snow facies of continental ice sheets and ice caps from Antarctica and Greenland contain particulate material and isotopic species which provide information about the physical properties of the atmosphere at the time of precipitation formation and deposition. Major conclusions from the study of microparticles in four deep ice cores are drawn. The detailed understanding of global climatic variations over the last 1000 years will be most important in predicting future climate variations over the next 100 years. (Auth. mod.)

F-30847

Nazintsev, IU.L., Fedotov, V.I., **Thermal metamorphism of antarctic sea ice** [O termicheskom metamorfizme morskikh l'dov Antarktiki], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.23-29, In Russian. 7 refs.

Monthly measurements of global radiation carried out for a year, from January through December, at Molodezhnaya Station, and six stages of ice cover condition observed during November through February on the Alasheyev Bight coast, are tabulated and discussed. Solar radiation and snow cover are found to play an important role in the rate of deterioration of ice. Data shows that in January the surface albedo constitutes 70 to 80% of the incoming global radiation on snow covered fast ice, 40 to 60% on ice without snow, and 18 to 32% on puddles covered with 3 to 5 cm of ice.

F-30849

Vtiurin, B.I., Moskalevskiĭ, M.IU., **Glaciological and geocryological studies on King George Island** [Gliatsiologicheskie i geokriologicheskie issledovaniia na o-ve King-Dzhordzh], ***Sovetskaia antarkticheskaia ekspeditsiia.*** *Informatsionnyĭ biulleten',* 1984 No.105, p.33-37, In Russian.

Studies of glacial and nival processes on King George Island, and surveys conducted on Fildes Peninsula, and Admiralty Bay, from December 30, 1979 to February 20, 1980, are reported. All-terrain vehicles were used on ice shield routes and a boat in crossing to the Nelson Island ice dome. Snow density and glacier thickness were measured; temperature and structure of snow-firn-ice strata were studied in marginal parts of the ice shield, as well as the dynamics of an ice dome edge, old and recent moraines, ground ice, and the role of snow cover on the thaw depth. Glacier motion in the summer months was found not to exceed 1.5 cm/day, or 5-5.5 m/yr. Cryogenic rock structures are described and classified. Cryogenic relief was mapped on Fildes Peninsula.

F-30863

Kornilov, N.A., Leont'ev, E.B., Denisov, A.S., **D/E *Gizhiga* operations off Hobbs Coast and organization of the new antarctic station Russkaya** [Plavanie D/E "Gizhiga" u berega Khobsa i otkrytie novoĭ antarkticheskoĭ stantsii Russkoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.5-12, In Russian. 2 refs.

Details of the construction of Russkaya Station on Hobbs Coast in 1980 are discussed, and the ice distribution and navigation conditions between 130-140 W and 72-74 S are shown on a chart. The most favorable conditions for the passage through ice, on the way toward Cape Burks, were found in the polynyas along 136 W. Ice dimensions at different points of the voyage are given. A topographic map of Russkaya Station is included.

F-30866

Barkov, N.I., **Study of the granulometric composition of ice core trace elements at Vostok Station by an electrooptical method** [Izuchenie granulometricheskogo sostava mikrochastits v ledianom kerne stantsii Vostok elektroopticheskim metodom], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.26-33, In Russian. 15 refs.

Study of ice cores obtained at Vostok Station show a significant relationship between the content of microparticles and the depth of the borehole. At 485 m, most trace elements have a diameter in the range of 0.4-2.5 mkm, the most frequent diameter being 1.1 mkm. At 885 m, microparticles with a diameter range of 0.1-1.8 are prevalent, the majority having a diameter of 0.6 mkm.

F-30867

Dubrovin, L.I., Preobrazhenskaia, M.A., **Antarctic ice berths** [O ledianykh prichalakh v Antarktide], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.33-41, In Russian. 11 refs.

Danger factors of ice navigation and of mooring on icy coasts are discussed, and the necessary conditions for safety, such as the minimum water depth and the optimum height of the ice berths, particularly for Soviet ships, are reviewed. Charts with locations of natural ice berths at Molodezhnaya Station, and the coastline at Mirnyy Station in 1957 and 1981, with marking of mooring places in the ice barrier, are presented.

F-30868

Kornilov, N.A., Nazintsev, IU.A., **Determination of the bearing capacity of antarctic ice** [Nekotorye aktual'nye voprosy opredeleniia gruzopod"emnosti antarkticheskikh l'dov], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.41-46, In Russian. 11 refs.

A review is presented of studies of ice cover resistance to heavy loads under field and laboratory conditions. Detailed instructions for successful experimentation—measuring of the thickness and temperature of ice layers and careful registration of cave-ins under pressure, among others—are given.

F-30878

Seeber, G., Hinze, H., **Determination of glacier ice drift parameters using satellite measurements in the Antarctic** [Bestimmung von Gletschereisbewegungen mit Doppler-Satellitenmessungen in der Antarktis], *Zeitschrift für Vermessungswesen,* Apr. 1984 109(4), p.176-186, In English with German summary. 12 refs.

During the southern summer periods 1982 and 1983 drift parameters of an antarctic glacier on Anvers Island were determined by use of satellite Doppler translocation techniques. Horizontal motion of 10 to 20 cm per day was derived from simultaneous translocation observations of 8 days with one fixed station on rock. Results from seasonal solutions correspond very well with values derived from two different years. The determination of height variations is supported by gravimetric observations. It is shown that a translocation solution is possible over a distance of 1400 km and that it improves the determination of shelf ice motion by the factor of two. (Auth.)

F-30881

Stringer, W.J., Barnett, D.G., Godin, R.H., **Handbook for sea ice analysis and forecasting,** *U.S. Navy. Naval environmental Prediction Research Facility. Contractor report,* June 1984 NAVENPREDRSCHFAC-CR-84-03, 324p. ADA-145 286.

Background information and techniques used to analyze and forecast sea ice conditions are presented. Emphasis has been placed on operationally-oriented analysis and forecast rules and aids and the use of climatological charts containing parameters related directly to operational decision-making based on sea ice conditions. Subject material includes sea ice morphology, characteristics and dynamics, global and regional sea ice distribution and behavior, sea ice modeling, remote sensing principles and techniques, remote sensing systems used for sea ice analysis, auxilliary sea ice observations, meteorological and climatological relationships with sea ice, operational sea ice analysis, and sea ice forecasting techniques. Numerous references are made to antarctic conditions, and charts, graphs, and photographs depict various states of the ice in antarctic waters. (Auth. mod.)

F-30910

Nagao, T., Yoshida, Y., **Estimation of the ice thickness of cirque glaciers by the gravimetric survey at the Yamato Mountains, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.9-16, 14 refs.

As part of geophysical investigations by JARE-22 gravity measurements were carried out along the inland traverse route and in the Yamato Mountains region in 1981. In the latter area, the depth of subglacial rock surfaces under two peculiar cirque glaciers and one outlet glacier was estimated by gravity measurements, in addition to the investigation of the gravity field in ice-free areas. Four results of special significance are emphasized: a steep decrease in bedrock height; the deepest bedrock reaches 265 m; relationships among cirque bottom depth and ice sheet depth; and the fault line location and orientation. These features are listed, located, discussed and interpreted. (Auth. mod.)

F-30931

Carleton, A.M., **Variations in antarctic sea ice conditions and relationships with Southern Hemisphere cyclonic activity, winters 1973-1977,** *Archives for meteorology, geophysics, and bioclimatology. Series B,* 1983 32, p.1-22, With German summary. 39 refs.

DLC QC851.A734

Interannual variations in the extent of antarctic sea ice are investigated for the winter growth seasons 1973-1977. Statistical correlations between the synoptic-scale atmospheric circulation and the latitudinal extent of the ice are evaluated on hemispheric and regional scales for each winter. Marked differences in winter cyclone activity accompany the year-to-year variations in ice growth and extent on a zonally-averaged basis, and are particularly evident for the extreme ice winters of 1973 and 1977. A link between the expansion of the sea ice zone during winter and the frequencies of new cyclonic developments is evident for latitudes immediately north of the ice-ocean boundary. Three key regions of high interannual variability in ice conditions are identified. Correlations between ice-edge latitude and cyclone frequencies show least variation between years in the East Antarctic sector. Conversely, ice-cyclone correlations vary markedly from year-to-year in the Weddell Sea. (Auth.)

F-30991

Arctic news record, Summer 1984, Vol.3 No.2, Bergen, Norway, Sep. 1984, 62p., For selected papers see: 39-1204 and 39-1205, or D-30993 and F-30992.

In a series of short news items the journal gives a wide-ranging overview of current cold regions technology. A few longer items (1-3p.) contain additional details on special features. The news items provide international coverage of activities in or near coastal areas. Pipeline construction, icebreakers, antarctic expeditions, gas exploration, and iceberg towing are a few of the topics of interest.

F-30992

Orheim, O., **Are antarctic icebergs towable,** *Arctic news record,* Sep. 1984 3(2), p.36-38.

A brief review is given of the possibilities of towing large antarctic icebergs to arid regions of the Southern Hemisphere. Towing to such places as Saudi Arabia seems a remote possibility due to water loss en route. A practical towable berg size is given as 1000x500x200 meters. The physical problems of a towing operation are discussed: stability of the icebergs, wave energy created by the berg and the effect of sea swells. Comparisons are made between towing costs and costs of water at destination and costs of sea water desalination.

F-31039

Hayward, R.J.C., **Glacier fluctuations in South Georgia, 1883-1974,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.47-61, 44 refs.

South Georgia has been continuously occupied since 1904 by personnel associated with the whaling industry or by members of scientific expeditions. Although these pioneers made no formal glaciological studies, many photographs were taken and some surveying was carried out. Data from archives and from personal collections have been assembled and analysed for evidence of fluctuations in the positions of glacier snouts. Different glacier types show differing responses to climatic change. Of 38 glaciers, for which multiple observations have been made, 13 show no significant change. The remainder have undergone oscillations during the present century which are, however, small compared with changes that have occurred in glaciers in the Northern Hemisphere. A comprehensive list of the sources of all known material on South Georgia glaciers is given in the Appendices. (Auth.)

F-31044

Jamieson, A.W., Wager, A.C., **Ice, water and energy balances of Spartan Glacier, Alexander Island,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.155-186, 16 refs.

Components of the energy balance of Spartan Glacier, Alexander Island, were measured during the period 1973-74. Conditions near the surface were dominated by gravity winds flowing down the glacier. There is no satisfactory theoretical treatment of this situation so estimates of sensible- and latent-heat exchange were necessarily crude. The accepted practice of measuring solar radiation with horizontally mounted radiometers gave misleading results because the glacier was not a diffuse scatterer at short wave-lengths. Approximately 50 per cent of the outgoing radiation was specularly reflected. The problem could be overcome by mounting the solarimeters parallel to the surface. Mass-balance measurements made between 1969 and 1974 showed that the glacier was decreasing by 1/500 of its mass per year, although errors in determining density caused uncertainties. Direct measurements of change of mass would enable the amount of energy used to melt ice to be determined accurately. The amount of sensible and latent heat could then be obtained as the residue of the energy balance. (Auth.)

F-31046

Pearson, M.R., Rose, I.H., **Dynamics of George VI Ice Shelf,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.205-220, 14 refs.

Experiments aimed at understanding the factors which affect mass flux at the bottom surface of an ice shelf have been made. Surface strain-rates were observed together with net balance at a number of points. Flow lines were determined from satellite imagery used together with survey measurements. Ice thicknesses were measured by airborne radio echo sounding. Bottom-flux profiles measured across the direction of flow allowed discrete ice streams within the ice shelf to be detected. In one area, an ice regime analogous to that of a consuming plate boundary in contemporary plate-tectonic theory was found. (Auth.)

F-31047

Wager, A.C., Jamieson, A.W., **Glaciological characteristics of Spartan Glacier, Alexander Island,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.221-228, 5 refs.

A summary is given of major characteristics of the glacier. These are presented in the form of tables, graphs, and sketches supplemented by text and include: surface elevation, ice thickness, seasonal and stake changes in mass, change in height, and mean meteorological values. A chart locates the glacier, its physical features are listed, and a summary is given of studies made on the glacier and when they were made.

F-31059

Physical conditions of fast ice formation in East Antarctica, *Polar geography,* Jan.-Mar. 1979 3(1), p.1-15, Refs. p.11-15. Translated from Sovetskaia antarkticheskaia ekspeditsiia. Trudy. Vol. 63, 1977, p.5-16.

DLC G575.P58

Studies of the fast ice formations around Antarctica have assumed increasing importance as the ice is being used as a natural loading and unloading platform for ship-borne supplies to antarctic stations. Each year, Soviet expedition ships deliver up to 12,000 tons of cargo to Antarctica, much of which is transported from ship to shore over fast ice. This use of the ice requires thorough knowledge about its bearing strength and the factors that are likely to weaken or break it. This article discusses the general meteorological and hydrologic conditions accounting for fast-ice formation, shoreline morphology and fast-ice distribution, as well as the morphology of the fast ice itself. (Auth.)

F-31060

Bearing strength of fast ice and antarctic transport operations during the spring-summer period, *Polar geography,* Jan.-Mar. 1979 3(1), p.15-30, Refs. p.28-30. Translated from Sovetskaia antarkticheskaia ekspeditsiia. Trudy. Vol. 63, 1977, p.104-118.

DLC G575.P58

The conditions for ship-to-shore cargo operations over the fast ice at the Soviet antarctic stations are described. The effect of temperature and structural nonhomogeneity of ice on the bearing strength is analyzed, and formulas are derived for computing the minimum thickness of fast ice required for the movement of various types of vehicles.

F-31068

Murray, C.W., Jr., Mueller, J.L., Zwally, H.J., **Matrix partitioning and EOF principal component analysis of antarctic sea ice brightness temperatures,** *U.S. National Aeronautics and Space Administration. Technical memorandum,* Apr. 1984 NASA-TM-83916, 89p., N84-27319, Refs. p.39-46.

A matrix partitioning scheme is presented for approximating EOF's or eigenvectors of a large sample covariance matrix. The data array, field of measured anomalies of some physical variable relative to their time averages, is partitioned in either the space domain or the time domain. The accuracy and efficiency of the method are demonstrated by applying the technique to the space-time distribution of Nimbus-5 ESMR sea ice brightness temperature measurements in the Weddell Sea and for the time period extending from September 30, 1973, through May 25, 1975. From analysis of the spatial EOF's and their coefficients maximum and minimum ice extents and the times of these extents can be identified. Regions and periods of ice growth and decay are identified as well as regions and periods of higher changes in growth and decay. The interannual variability in the Weddell Polynya between 1973 and 1974 is exhibited by the fourth EOF and its principal component. Power spectral analysis of the principal components reveal periods which can be related to the seasonal cycle of sea ice growth and decay in the Weddell Sea. (Auth.)

F-31075

Jouzel, J., Merlivat, L., **Deuterium and oxygen 18 in precipitation: modeling of the isotopic effects during snow formation,** *Journal of geophysical research,* Dec. 20, 1984 89(D7), p.11,749-11,757, 38 refs.

The classical Rayleigh model assuming isotopic equilibrium fails to explain the deuterium and oxygen 18 contents of polar snow. This model leads to too high temperature-isotope gradients to too low D/O-18 slopes, and consequently to an excessively large range of deuterium excess values. A new model is proposed that takes into account the existence of an isotopic kinetic effect at snow formation as a result of the fact that vapor deposition occurs in an environment supersaturated over ice. This kinetic effect is thoroughly discussed from a microphysical point of view and tested against experimental data and field observations made in East Antarctic during the 1972-1973 IAGP traverse. This new formulation reconciles predicted and observed values both for the temperature-isotope and D-D/O-18 relationships for reasonable values of supersaturation over ice.

F-31088

Friedli, H., Moor, E., Oeschger, H., Siegenthaler, U., Stauffer, B., **C-13/C-12 ratios in CO2 extracted from antarctic ice,** *Geophysical research letters,* Nov. 1984 11(11), p.1145-1148, 24 refs.

Air is extracted from bubbles of polar ice samples by a dry extraction method, and the C-13/C-12 ratio is measured on CO2 separated from the air. Ice samples of typically 700 g are crushed at ca. -20C, the evolving air is trapped cryogenically, and CO2 is frozen out from this air for mass-spectrometric isotope analysis. First delta C-13 and delta O-18 results of CO2 from Antarctic ice cores are presented, and delta C-13 is discussed in relation to atmospheric CO2 variations. Delta C-13 of 400 to 800 year old ice is *ca.* 1.1 per mille higher than the 1980 atmospheric value, which agrees well with model-based estimations. The measurement of three ca. 50,000 year old samples yielded astonishingly low values, but contamination cannot be excluded. (Auth.)

F-31103

Lorius, C., **Data from antarctic ice cores on CO2, climate, aerosols, and changes in ice thickness,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.49-62, PB85-110 757, 33 refs.

Analyses of polar ice cores have yielded a number of parameters that provide proxy data on climate changes and on important factors that may influence them. In particular, the isotopic composition of the ice is an indicator of temperature change, the amount of impurities is linked with aerosol concentration, and the amount and composition of entrapped air reflect the ice thickness and atmospheric composition. Appropriate information has already been obtained from antarctic ice cores on time scales covering climatic transition from the late glacial maximum to the Holocene and the last few hundred years or so. Both of these periods are characterized by a significant and comparable increase in CO2, but climatic parameters and other forcing factors show very different changes. (Auth.)

F-31106

Ackley, S.F., **West antarctic sea ice,** MP 1818, Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.88-95, PB85-110 757, 14 refs.

In constructing models for predicting antarctic sea ice effect on global climate, temperature and wind fields over and below the pack ice must be analyzed. These elements affect the maximum extent of the ice pack and the ice dynamics in the pack strongly modulates the CO2-induced temperature rises. These factors are discussed in text and diagrams.

F-31110

Paterson, W.S.B., **Present and future melting on antarctic ice shelves,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.140-154, PB85-110 757, 42 refs.

Data on surface ice melt rates on ice shelves are reviewed; their increase by CO2-induced warming is predicted; and the impact of these conditions is assessed. Atmospheric warming will increase the ocean temperature and thus the amount of heat available for basal melting, which may well be more important than changes at the surface. (Auth.)

F-31114

Parkinson, C.L., **Modelled and observed sea ice variations in the West Antarctic and surrounding regions,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.222-236, PB85-110 757, 27 refs.

Supported by satellite data, the author depicts and reviews the seasonal states of southern sea ice. Accuracy of data on these variations has substantially improved over the past 20 years as satellite technology provided solid information to work from. These images have shown decreases in sea ice extent which could be attributed to CO2 increases. Interest in modeling antarctic sea ice heightened as more data became available and a large measure of success was achieved. The value of models which couple the aspects of sea, ocean, and atmosphere, has not been established.

F-31127

Kohnen, H., comp, **Filchner-Ronne Ice Shelf programme, Report 1 (1984),** Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, 38p., Refs. passim.

Glaciological investigations carried out on the Filchner/Ronne Ice shelves in the past, current activities, and future plans are summarized. Representatives of Argentina, Federal Republic of Germany, Great Britain, Norway, the United States, and the USSR report on their countries' programs. The goal is a coordinated, long-term, effort leading to a comprehensive investigation which will result in a detailed picture of the glaciological regime of these long known, seldom studied, and little understood ice shelves.

F-31136

Robin, G. de Q., **Polar ice sheets: developments since Wegener,** *Geologische Rundschau,* May 1981 70(2), p.648-663, In English with German, French and Russian summaries. Refs. p.661-663.

DLC QE1.G4917

Wegener's expeditions pioneered many measurements that are now essential for computer modelling of ice sheets. Advances in knowledge of accumulation, thickness, temperature, crystal fabric and surface mapping of ice sheets and of impurities, gas content and isotopic ratios of ice cores from these ice sheets are outlined before computer modelling work is discussed. The value of such studies in providing large scale tests of geophysical concepts is emphasized. The paper concludes by suggesting that the drag of continental ice sheets on the top of continental blocks might be of comparable magnitude and tend to balance forces on the base of these blocks by motion of the asthenosphere. Apart from providing a possible reason for the aseismic nature of the antarctic and Greenland land masses, the hypothesis provides a suitable link between Wegener's interest in continental ice sheets and continental drift. (Auth.)

F-31139

Jiang, Z., **Quantitative analysis of snow-line zonality,** *Journal of glaciology and cryopedology,* 1984 6(2), p.27-35, 6 refs., In Chinese with English summary.

Horizontal snow-line zonality in the Southern and Northern Hemispheres obeys the mathematical model of normal frequency distribution function. Maximum values appear at a low latitude and inflection points appear at a middle latitude area. Snow line elevation depends on the relative annual average temperature and the difference between annual ablation value and precipitation. An analysis of the model shows that the snow-line zonality results from the zonality of moisture and heat distribution. Data are given on mean air temperature and precipitation in both hemispheres.

F-31155

Reinwarth, O., Lange, M., Bässler, K.-H., **Program and preliminary data of glaciological studies of the Filchner Ice Shelf 1983/84** [Programm und vorläufige Ergebnisse der glaziologischen Arbeiten auf dem Filchner-Schelfeis 1983/84], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.37-52, In German. 11 refs.

A report is given of some early results of a traverse extending to about 150 nm SW of Filchner Station made from Jan 1 through Feb 13, 1984. During the traverse ice temperature measurements at 10 m depth were made at Stations 141, 240, 241, and 340 and a snow/ice profile interpretation was developed. Additionally, heat capacity measurements of the upper 2 to 3 m of the ice were made using a needle sonde. At Station 340 ice cores were drilled to a depth of 100 m to measure temperature. Other glaciological aspects were observed closer to Filchner Station and at the ice edge.

F-31156

Lange, M.A., **Survey of the ice shelf edges in the eastern and southern Weddell Sea,** *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.53-56, 3 refs.

The study was accomplished using the ATLAS 8500 AC/TM radar system aboard *Polarstern.* At distances of <12 nm, shipboard resolution produced position accuracies of 0.2 nm in distance and 0.2 deg azimuth. The ice edge was surveyed from 8W to 60W encompassing the Ekström, Risser-Larsen, Brunt, and Filchner Ice Shelves.

F-31158

Thyssen, F., Blindow, N., Hungeling, A., Hoyer, M., **Geophysical and glaciological investigations in the vicinity of Filchner and Georg von Neumayer Stations during the 1983/84 field season** [Geophysikalische und glaziologische Untersuchungen in der Umgebung der Filchner- und der GvN-Station in der Saison 1983/84], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.64-70, In German. 2 refs.

A brief project outline is given, accompanied by charts and diagrams of the research region and electromagnetic reflection data. The projects include: a 60 km long electromagnetic profile of sea ice strength; aerial survey of the ice edge; electromagnetic waves in firn and ice for fine structure analysis; ice thickness and temperature measurements; and 5 24-channel seismic profiles around Filchner Station.

F-31159

Jessberger, H.L., Bässler, K.-H., **Report of the engineering glaciology group on their work during the 1983/84 Expedition at GvN and Filchner Stations** [Bericht der Gruppe "Ingenieurglaziologie" über die Arbeiten der Expedition 1983/84 an der Georg-von-Neumayer- und Filchner-Station], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.71-81, In German. 6 refs.

Discussed in this report and illustrated by charts and diagrams are: the *in situ* measurement of and the state of deformation of the shelf ice at the stations; the effect it is having on structures such as the meteorology mast; and the ice drill used during the investigations.

F-31171

Robinson, P.H., **Ice dynamics and thermal regime of Taylor Glacier, south Victoria Land, Antarctica,** *Journal of glaciology,* 1984 30(105), p.153-160, 30 refs., French and German summaries.

Glaciological data collected from Taylor Glacier have been used to assess aspects of the dynamics and thermal regime of the glacier. Mass-balance studies suggest that the glacier is in near equilibrium. The thermal condition of the basal ice over much of the ablation area was calculated from estimates of the geothermal heat influx and measurements of near-surface ice temperatures, ice velocities, and ice thickness. It was found that, in as much as 50% of the lower ablation area, the basal ice may be melting. (Auth.)

F-31172

Potter, J.R., Paren, J.G., Loynes, J., **Glaciological and oceanographic calculations of the mass balance and oxygen isotope ratio of a melting ice shelf,** *Journal of glaciology,* 1984 30(105), p.161-170, 20 refs., French and German summaries.

Glaciological estimates of the ice supply to George VI Ice Shelf are obtained by integrating the accumulation over the catchment. The basal melt rates for the ice shelf are calculated by balancing the accumulation with calving and melting. We calculate an average equilibrium melt rate for the ice shelf of 2 m/a. The mean oxygen isotope composition of recent accumulation on the catchment is determined by using accumulation and isotope data, supplemented by temperature measurements and a close empirical relationship between isotope ratio and temperature. The catchment has a mean isotope ratio of -20.8 per mill relative to SMOW. Sea water under the ice shelf at the north of George VI Sound is Warm Deep Water modified by melting ice. The melting ice has an isotope ratio of -20.3 per mill. Good agreement in isotope ratios suggests that the melting ice is from the catchment and because the basal ice of George VI Ice Shelf represents accumulation over the last few millennia the implication is that there has been no systematic change in the isotope composition of the accumulation during this period. (Auth.)

F-31173

Thwaites, R.J., Wilson, C.J.L., McCray, A.P., **Relationship between bore-hole closure and crystal fabrics in antarctic ice core from Cape Folger,** *Journal of glaciology,* 1984 30(105), p.171-179, 15 refs., French and German summaries.

Two holes, over 300 m deep underwent considerable closure below 250 m. The closure observed in the holes was non-uniform and occurred in zones 0.5 to 3 m wide. High-closure zones are characterized by interlocking and irregular-shaped ice grains with many sub-horizontal *c*-axes and only occasional *c*-axis clusters at a high angle to the flow plane. Low-closure zones contain tabular grains with the long dimension parallel to the flow plane, abundant deformation features and a predominance of *c*-axes oriented at a high angle to the flow plane. The relationship between closure rate and *c*-axis fabric is attributed to marked plastic flow by intracrystalline slip on the basal plane to produce higher closure in areas where there is a greater variation in *c*-axis orientation. This deformation is attributable to overburden pressure and hence is related to depth, and is independent of shear within the main body of the ice mass. (Auth.)

F-31174

Keys, J.R., Williams, K.L., **Rates and mechanisms of iceberg ablation in the d'Urville Sea, southern ocean,** *Journal of glaciology,* 1984 30(105), p.218-222, 14 refs., French and German summaries.

Wave action causes ablation in a narrow zone around an iceberg's waterline, at up to 0.3 m per day, in water of -1C with waves up to

0.4 m high. Subsequent subaerial calving of ice from iceberg sides takes place up to a similar rate. Submarine melting is an order of magnitude slower than wave action but acts over the largest part of an iceberg. Ablation rates derived theoretically or statistically elsewhere for comparable environmental conditions, are in reasonable agreement with those measured here. Drifting icebergs trail a plume of mixed, slightly cooled and diluted sea-water in their wake. (Auth.)

F-31175
Koci, B.R., Kuivinen, K.C., **PICO lightweight coring auger,** *Journal of glaciology,* 1984 30(105), p.244-245, French and German summaries., Also in: Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.601-607.

A new lightweight hand-operated coring auger for use in firn or ice is described. Extensive use of glass-epoxy composites contributes to a drill weight of approximately 1 kg/m in 20 m and 50 m configurations. (Auth.)

F-31229
Jezek, K.C., **Radar measurements of borehole geometry on the Greenland and Antarctic ice sheets,** *Geophysics,* MP 1817, Feb. 1985 50(2), p.242-251, 12 refs.

A method for measuring the geometry of boreholes in glaciers has been developed and tested in Greenland and Antarctica. Coordinates of points along the borehole are determined by lowering a passive radar target into the borehole and then tracking the target from three surface stations. Comparison of geometry interpreted from radar data and from a conventional inclinometry experiment indicates that radar data can be used to estimate average borehole inclination and azimuth but cannot be used to measure details of the borehole geometry that are revealed by conventional inclinometry surveys. Random error introduced by variations in the physical properties of the glacier and electrical noise in the radar unit limit measurement accuracy, but the accuracy can be improved by establishing additional surface radar stations around the borehole. These experiments demonstrate the utility of the radar method and suggest the possibility of deploying permanently installed radar targets in ice sheets to measure intraglacial movements. (Auth.)

F-31249
In the hostile world of ice [En el mundo hostil de los hielos], *Antártida,* Feb. 1984 No.13, p.35-42, In Spanish.

The geography, topography and climate of Antarctica and its surrounding waters are reviewed, with particular emphasis on the ice, its various forms and dangers, and the role it plays in the world climate.

F-31285
Jezek, K.C., Alley, R.B., Thomas, R.H., **Rheology of glacier ice,** *Science,* MP 1844, Mar. 15, 1985 227(4692), p.1335-1337, 13 refs.

A new method for calculating the stress field in bounded ice shelves is used to compare strain rate and deviatoric stress on the Ross Ice Shelf, Antarctica. The analysis shows that strain rate (per second) increases as the third power of deviatoric stress (in newtons per square meter), with a constant of proportionality equal to 2.3 x 10 to the -25th power. (Auth.)

F-31427
Bentley, C.R., **West antarctic ice sheet: diagnosis and prognosis,** Carbon dioxide, science and consensus: Carbon Dioxide Research Conference, 1982, Proceedings, 1983, p.IV.3-IV.50, 32 refs.

Some authors have attributed the global rise in sea level over the last century, and a disputed acceleration of that rise in the last 40 years, to mass loss from the West Antarctic ice sheet. Field evidence from Antarctica, however, does not support that conclusion. Instead, the data strongly suggest that the ice sheet, if it is changing at all, is growing rather than shrinking. Evidence for this is particularly good in the Ross Sea and Pine Island Glacier drainage systems. (Auth.)

F-31460
Neftel, A., Jacob, P., Klockow, D., **Measurements of hydrogen peroxide in polar ice samples,** *Nature,* Sep. 6, 1984 311(5981), p.43-45, 19 refs.

Hydrogen peroxide, a powerful oxidant, is believed to be a key component in the oxidation of SO2 and H2SO4 in clouds. The first quantitative H2O2 measurements in snow, rain, hoarfrost and fog were reported in 1874, however, systematic investigations of H2O2 concentrations in precipitation and hydrometeors began only a few years ago. We report here measurements of hydrogen peroxide in polar ice samples. To our knowledge, chemically-reactive species have not been previously analysed in ice core samples. Our measurements show that H2O2 is a dominant trace compound present in clouds over remote and clean areas. (Auth.)

F-31461
Smedstad, O.M., Röed, L.P., **Coupled ice-ocean model of ice breakup and banding in the marginal ice zone,** *Journal of geophysical research,* Jan. 20, 1985 90(C1), p.876-882, 12 refs.

A coupled ice-ocean numerical model for the marginal ice zone is considered. The model consists of a nonlinear sea ice model and a two-layer (reduced gravity) ocean model. The dependence of the upwelling response on wind stress direction is discussed. The results confirm earlier analytical work. It is shown that there exist directions for which there is no upwelling, while other directions give maximum upwelling in terms of the volume of uplifted water. The ice and ocean is coupled directly through the stress at the ice-ocean interface. An interesting consequence of the coupling is found in cases when the ice edge is almost stationary. In these cases the ice tends to break up a few tenths of kilometers inside of the ice edge. (Auth.)

F-31462
Lingle, C.S., Clark, J.A., **Numerical model of interactions between a marine ice sheet and the solid earth: application to a west antarctic ice stream,** *Journal of geophysical research,* Jan. 20, 1985 90(C1), p.1100-1114, 48 refs.

A time-dependent numerical model has been constructed that simulates retreat of a West Antarctic ice stream from the edge of the continental shelf during the Holocene period of rising sea level. This paper describes a method for computing the deformation of the solid earth caused by changes in ice and water loading during retreat of the ice stream. The relative sea level changes caused by earth deformation are incorporated as a feedback mechanism in the ice stream model. Elastic and viscous uplift of the earth, caused by thinning of the ice stream and its catchment area, delayed retreat of the grounding line relative to computed retreat when the ice stream was assumed to be resting on a rigid earth. Computed retreat of the grounding line began very slowly because of rising eustatic sea level. Within the context of a given ice shelf retreat history the feedback effects of earth deformation caused a reduction of the grounding-line retreat rate, a reduction of the total computed retreat distance, and a readvance of the grounding line after eustatic sea level stopped rising. (Auth. mod.)

F-31463

Palais, J.M., Legrand, M., **Soluble impurities in the Byrd Station ice core, Antarctica: their origin and sources,** *Journal of geophysical research,* Jan. 20, 1985 90(C1), p.1143-1154, 30 refs.

Results are presented of analyses of the major soluble impurities made on bulk samples selected at approximately 50 m intervals down the length of an ice core from Byrd Station. Most samples are in ionic balance, and it is therefore possible to suggest with which compounds the ionic impurities are linked. These compounds include an important contribution from both sea salts and strong acids. The Cl/Na mole ratio is quite stable throughout the core and hovers about the expected bulk sea water ratio. In general, the marine-derived components at Byrd Station decreased by a factor of 2 between the Late Glacial Maximum and Holocene while the gas-derived acid components decreased by a factor of only 1.5. Some possible causes of these variations are suggested. (Auth.)

F-31465

U.S. Naval Polar Oceanography Center, **Antarctic ice charts, 1979-1980,** Suitland, MD, May 1981, 120p. AD-A098 666.

This antarctic sea ice atlas contains weekly charts depicting Southern Hemisphere ice conditions and extents. The information presented was prepared under operational time constraints principally from satellite imagery supplemented by conventional observations. A table summarizes satellite data availability for 1979 and 1980.

F-31496

Nakawo, M., Narita, H., Isobe, T., **Glaciological research program in east Queen Maud Land, East Antarctica, Part 2, 1983,** *Japanese Antarctic Research Expedition. JARE data reports,* Nov. 1984 No.96, 80p. + map, 11 refs.

One of the major activities of JARE-24 in 1983 was an oversnow traverse beyond the Yamato Mountains to the Sör Rondane Mountains. Several other trips were also made in 1983, including those commissioned to support and supply Mizuho Station. Oversnow traverses by JARE-24 are shown in Fig. A, and listed in Table I-1. The following data are compiled in this paper: position, elevation and ice thickness of stations; net accumulation of snow measured by the stake method; surface meteorological data during the oversnow traverses. Other data such as surface flow velocity, surface strain rate and surface slope of the ice sheet, will be presented elsewhere. Net snow accumulation and temperature profiles in a surface snow layer at Mizuho Station are also reported. (Auth.)

F-31535

Glode, P., Gernandt, H., Drescher, K., **Investigation of the sea-ice variation in the Weddell Sea during the summer navigation period by use of APT-weather pictures,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.195-199.

Analysis of APT weather pictures taken at the GDR laboratory at Novolazarevskaya Station since 1975 indicates that the sea ice extent of the Weddell Sea at the end of winter has increased remarkably since 1975, but the annual decay with a steepest decrease of sea ice extent in December finally opens the approach to the south coast of the Weddell Sea in December or January independently of sea ice extent at springtime. Some other features of sea ice variation are reported: e.g., the split of the ice cover of the Weddell Sea into a western part never decaying entirely and an eastern field mostly splitting into smaller patches and decaying before the end of the season. (Auth.)

F-31560

Kudriashov, B.B., Chistiakov, V.K., Morev, V.A., **Results of and future prospects for the development of ice core drilling equipment and technology,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.574-583, 5 refs.

The results of Soviet testing of thermal drills in antarctic ice-core drilling are discussed; the thermodrill specifications are tabulated and parts are named and illustrated.

F-31561

Tillson, R.A., Kuivinen, K.C., **Ice core science trench for use by glaciologists on the Greenland ice sheet,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.584-590.

A synopsis of the Greenland Ice Sheet Program (GISP) deep ice core drilling project conducted during 1979-1981 is presented. The design, construction and use of a multidisciplinary, on-site core analysis facility are described. The GISP research program and analytical facilities are suggested as a successful model for future glaciological research programs on the ice sheets of Greenland and Antarctica. (Auth.)

F-31594

Nishio, F., **Preliminary study of glacial geomorphology in area between Breid Bay and the Sör Rondane Mountains in Queen Maud Land, East Antarctica,** *Antarctic record,* Dec. 1984 No.83, p.11-18, With Japanese summary. 10 refs.

The obstruction by the Sör Rondane Mountains to the ice flow causes the elevated ice surface south of the mountains, and also the extremely low level north of the mountains. Outlines of the ice shelf front and the respective positions have remained unchanged over twenty-three years, but the reentrant, a widely and deeply fractured zone, is formed in in the ice shelf between the Base Roi Baudouin and the ice front. It was found that the reentrant was formed between 1967 and 1973, and further fracturing of the platform of this ice shelf may occur with the development of crevasses, and therefore the ice shelf may break off. A rough estimate of the mass budget of the ice sheet in the area between Breid Bay and the Sör Rondane Mountains suggests that the ice sheet may keep the present shape owing to the high accumulation rate over the ice sheet surface at present. If the present accumulation rate decreases, a lowering of the ice sheet surface may occur and, therefore, the thinning of the ice sheet lies well below sea level. (Auth.)

F-31599

Nishio, F., Naito, Y., Iwanami, K., Futatsumachi, S., **Studies on the supraglacial lake located on the Shirase Glacier near the Oku-hyoga Rock,** *Antarctic record,* Dec. 1984 No.83, p.75-80, In Japanese with English summary. 3 refs.

On the east side of the Shirase Glacier near the Oku-hyoga Rock a supraglacial lake has been observed nearly at the same position since January 1962. The lake is 2700 m long and 360 m wide. The elevation of the lake's surface is between 56 and 65 m above sea level and the bottom of the lake is 16 to 25 m above sea level. The lake water was collected and its specific conductivity measured. The composition of the lake water shows it to be melted snow or ice, not sea water. Therefore, the bottom of the lake might not be connected with the sea. The lake may have been formed by a fissure on the glacier ice resulting from the strong shear stresses between the west side of fast moving glacier ice mass in the Shirase Glacier and the east side of ice mass obstructed by the subglacial topography. (Auth.)

F-31606

Vtiurin, B.I., **Snowdrift patches on King George (Waterloo) Island** [Naveiannye snezhniki ostrova King-Dzhordzh (Waterloo)], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii. Khronika obsuzhdeniia,* 1984 Vol.50, p.209-214, 7 refs., In Russian with English summary.

Permanent snowdrifts are well spread over the ice-free areas of King George Island and along the margins of the ice sheet. They are abundant in the wind shadow of ice cliffs and elevations of the bedrock in the glacier-free areas. The Fildes Peninsula—the largest ice-free area—numbers over 20 permanent snowdrifts, each of them exceeding 1 sq km. They play a leading role in the formation of the present-day exogenetic relief of the island, particularly in the occurrence of cryogenic-denudation terraces. The paper analyses regularities in the spreading of permanent snowdrifts. Special attention is drawn to the analysis of ice structure. The texture of ice and its structural peculiarities as well as their changes with depth are analysed with special reference to one of the permanent snowdrifts. (Auth.)

F-31607

Kohnen, H., comp, **Filchner-Ronne Ice Shelf programme, Report 2 (1985),** Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, 136p., Most papers in German with English summary. For individual papers see 39-2800 through 39-2815 or C-31609, -31616, E-31621, F-31608, -31610, -31611, -31623, -31624, I-31612, -31617 through -31620, -31622, J-31613, L-31614, and L-31615.

The report summarizes first results obtained from analysis of data collected during Phase I investigations in 1983/84 of the Filchner Ice Shelf Project and from related studies presented as papers at the First Filchner Colloquium in October 1984. It includes brief statements of findings in, among other topics, shelf ice accumulation, variations in the ice shelf over the Weddell Sea, borehole studies of the ice shelf, aeromagnetic studies of the ice shelf, katabatic winds, VLF emissions, satellite measurements of the Antarctic Peninsula, aircraft instrumentation, and electromagnetic soundings of the ice shelf.

F-31608

Reinwarth, O., Graf, W., **New investigations of accumulation on the Filchner/Ronne Ice Shelf** [Neuere Untersuchungen zur Akkumulation auf dem Filchner/Ronne Schelfeis], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.7-17, In German with English summary. 17 refs.

Studies during 1983/84 provide accumulation data for a profile parallel to the ice edge between the western margin and Filchner station and in particular for a traverse route, perpendicular to the ice edge starting at Filchner station and extending 250 km to the SW. Determination of annual layering is based mainly on the analysis of isotopic content (O-18) of samples taken from snow pits, which were dug at 50 km intervals along the traverse. Delta O-18 values of snow pit samples show a pronounced annual variation yielding a reliable time scale. The derived accumulation rates decrease from west to east along the ice edge profile from 30 to 20 g/cm2/a and from Filchner station to the southern end of the traverse from 20 to 15 g/cm2/a, thus leading to rather low accumulation values in the central part. In general low density values for 0-2 m depth also decrease with distance from the ice edge. Ten meter temperatures lower from -25.0 to -27.4 deg and the mean delta O-18 values drop from -24.6 to -28.8%. This change of isotopic content with temperature is greater than the mean delta value-temperature relationship found for the West Antarctic. (Auth.)

F-31610

Lange, M., **Variation of the ice edge position in the eastern and southern Weddell Sea** [Variation des Schelfeiskantenverlaufs in der östlichen und südlichen Weddell See], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.26-31, In German with English summary. 4 refs.

New data are reported on the position of ice edges in the eastern and southern Weddell Sea for the years 1983 and 1984. The data are derived from ship borne radar measurements of individual points along the ice edge together with ship's positions obtained by a satellite navigation system on board RV *Polarstern*. They are accurate to within 0.23 to 0.4 nm (426-741 m). Comparisons of ice shelf margins for the years 1980, 1983 and 1984 allow estimates of the apparent ice edge advance during this period. Together with quantitative ice edge velocities, first conclusions about the ablation along the ice shelf margins in the eastern and southern Weddell Sea are derived. (Auth.)

F-31611

Jessberger, H.L., Bässler, K.-H., **Ice core drilling and drill hole investigations on the Filchner and Ronne Ice Shelves, Antarctica** [Eiskernbohrungen und Bohrlochuntersuchungen auf dem Filchner/Ronne Schelfeis, Antarktis], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.32-41, In German with English summary. 6 refs.

An electromechanical shallow ice drill was built following, with a few modifications, the Rufli Ice Drill type. The new equipment was tested in 1981 and 1983 on a glacier of the Alps. During the Antarctic expeditions 1981/82 and 1982/83 it was used on the Ekström Ice Shelf. A hole through the shelf ice was drilled in 15 days (202.8 m). Two boreholes were drilled during the Filchner/Ronne-Ice Shelf traverse 1983/84. The ice drill equipment is developed for taking ice cores from the ice shelf for mechanical and chemical investigations. *In situ* measurement systems for the deformation behavior of the shelf ice can be installed into the boreholes. (Auth.)

F-31623

Nielson, H., **Sulphur isotope measurements in antarctic firn: a method for studying the atmospheric sulphur cycle** [Schwefel-Isotopenmessungen am antarktischen Firnschnee: ein Weg zur Erforschung des atmosphärischen Schwefelkreislaufs], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.118-123, In German with English summary. 3 refs.

S isotope data from snow-firn samples taken near Georg von Neumayer Station in 1980/81 and 1981/82 are analysed for two components: isotopically heavy marine sulfate (seaspray or sea ice), which in its concentration usually correlates with the chlorinity, and isotopically light biogenic sulfur, probably transported as volatile S organic compounds and lateron oxidized to sulfate. Generally the sulfur of the samples investigated is dominated so strongly by the marine sulfate that the budget of the biogenic component can be evaluated only with great uncertainty. Better results are expected from future core drillings at a greater distance from the shoreline. Then it will also be possible to verify seasonal or long-term variations of the biological productivity in the circumpolar ocean. (Auth.)

F-31624

Seeber, G., **Doppler satellite measurements on the Antarctic Peninsula** [Doppler-Satellitenmessungen auf der Antarktischen Halbinsel], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.124-129, In German with English summary. 2 refs.

Doppler observations were performed between 1982 and 1984 in order to determine ice motion parameters on Anvers Island. Through translocation techniques with a reference station on rock, four control points were installed on ice. Drift rates are between 0.1 m and 0.2 m/year. From comparisons between repeated observations in different years and seasonal solutions it can be seen that translocation observations over less than 1 week lead to significant results. In comparison with parallel observations on the Filchner Ice Shelf it could be shown that with translocation observations over a distance of 1,500 km the necessary observation time for the determination of ice motion parameters can be reduced by half. The future role of GPS for Antarctic research is discussed. (Auth.)

F-31625

Zotikov, I., **Not a search for kiwi bird** [IA iskal ne ptitsu kivi], Leningrad, Gidrometeoizdat, 1984, 144p., In Russian.

The author, a Soviet glaciologist with more than 20 years of participation in Soviet and American antarctic expeditions, writes of his work on the Ross Ice shelf, his visits and cooperation with U.S. research institutions, and personal experiences and observations in the U.S. and New Zealand.

F-31636

Moriwaki, K., **Antarctic configuration and the antarctic ice sheet** [Nankyoku no chikei to hyoga], *Chiri,* March 1983 38(3), p.20-32, 28 refs., In Japanese.

The size of Antarctica has been variously estimated, but now we have a map which shows the most recent data that has been analyzed, and is said to be the most reliable to date. Most of the data is based on Drewry's *Measured properties of the antarctic ice sheet: surface configuration, ice thickness, volume and bedrock characteristics.* This shows the development and transformation occurring in the antarctic ice sheet.

F-31646

Tingey, R.J., **Development and fluctuation of Antarctica's Cenozoic glaciation: the terrestrial record,** *Australian meteorological magazine,* June 1982 Vol.30(2), p.181-189, For same article from a different source see 13F-27493 or 37-1384.

The Dry Valleys region, near McMurdo Sound in the southwest corner of the Ross Sea, displays a history of multiple glaciations that involved complex interplay between outflow glaciers from the east Antarctic ice sheet, local mountain glaciers, and glacial marine incursions from the Ross Sea area. Elsewhere in Antarctica, volcanic rocks that are thought to have been erupted either over early glaciated surfaces, or under glaciers, provide a means for estimating when Antarctic glaciation started. Dates range back to Oligocene times in West Antarctica, and to early Miocene times in East Antarctica's Transantarctic Mountains although glaciological considerations appear to demand that glaciation started first in the latter area. Evidence for fluctuations in the antarctic ice sheet is widespread with at least two glacial stands higher than the present one indicated at many places. The Dry Valleys glacial geology record also shows that at least 400 m of uplift has occurred in the area since Miocene times. (Auth. mod.)

F-31647

Bradley, R.S., **Quaternary paleoclimatology. Methods of paleoclimatic reconstruction,** Boston, Allen & Unwin, 1985, 472p., Refs. p.417-462.

This book is an introduction to methods used in reconstructing past climates from proxy data series. A summary of each method is provided, acquainting the reader with the main characteristics of the paleoclimatic record. In reviewing the global climatic variations it is pointed out that, in the Southern Hemisphere, the presence of the high elevation antarctic plateau south of 75S causes there to be a much stronger Equator-Pole temperature gradient than in the Northern Hemisphere. In interpreting isotopic values in world ice cores, temperature and moisture changes are considered which have had an effect on the isotopic composition of antarctic precipitation through time. In the dating of ice cores, the difficulty of counting annual layers in Antarctica, due to low yearly accumulation rates, is discussed. In tabulating the sea-surface paleotemperature reconstructions for 18,000 years BP, Radiolaria is used as the principal faunal group for the antarctic ocean, and the ocean's morphological variations with regard to coiling direction, size, shape, and surface structure are reviewed.

F-31659

Diurgerov, M.B., Korolev, P.A., **Possibility of joint application of nivometric and stratigraphic methods of measuring accumulation for more accurate determination of accumulation rate in the central areas of Antarctica** [Vozmozhnosti sovmestnogo primeneniia snegomernogo i stratigraficheskogo metodov izmereniia akkumuliatsii dlia utochneniia skorosti pitaniia tsentral'nykh raĭonov Antarktidy], *Antarktika; doklady komissii,* 1985 No.24, p.82-86, In Russian. 4 refs.

The paucity of yearly accumulation and redistribution of drift snow in central Antarctica is discussed, and the fact that the determination of yearly layers is only possible when using snow-measuring poles is pointed out; stratigraphic and isotopic methods alone do not provide this data. The advantages of using both methods are described, and calculations of the thickness of yearly layers are presented based on stratigraphic data and on snow accumulation measurements obtained with more than 500 poles between Vostok Station and Dome C.

F-31660

Diurgerov, M.B., Korolev, P.A., **Use of snow airfields in Antarctica for determination of accumulation rate and atmospheric precipitation** [Ispol'zovanie snezhnykh aerodromov Antarktidy dlia opredeleniia skorosti akkumuliatsii i kolichestva atmosfernykh osadkov], *Antarktika; doklady komissii,* 1985 No.24, p.87-93, In Russian. 6 refs.

Determination of yearly snow accumulation rate from snow cores obtained on airfields at Mirnyy and Vostok stations is described, and results for the years 1955-1981 are tabulated. Snow and firn structure at Mirnyy Station is also shown.

F-31661

Salamatin, A.N., Lipenkov, V.IA., Smirnov, K.E., Zhilova, IU.V., **Density and rheological properties of glacier ice** [Plotnost' lednikovogo l'da i ego reologicheskie svoĭstva], *Antarktika; doklady komissii,* 1985 No.24, p.94-106, In Russian. 30 refs.

The recrystallization process of glacier ice formation, observed in vertical profiles of ice layers 1414 m thick in a borehole at Vostok Station, showed 5 stages: snow, firn, compression of air inclusions, air decomposition, and pure, polycrystalline ice. A mathematical model of the compression processes of glacier ice with gas bubbles is presented.

F-31670

U.S. National Aeronautics and Space Administration. Science Working Group for the Special Sensor Microwave Imager (SSM/I), **Passive microwave remote sensing for sea ice research,** Washington, D.C., NASA, Dec. 1984, 55p., Refs. p.52-55.

This report summarizes how data gathered by remote sensors on satellites can be utilized for sea ice research, and describes how the brightness temperatures measured by a passive microwave imager can be converted to maps of total sea ice concentration, and to the areal fractions covered by first year and multiyear ice. Several ancillary observations, especially by means of automatic data buoys and submarines equipped with upward-looking sonars, are needed to improve the validation and interpretation of satellite data. The design and performance characteristics of the Navy's Special Sensor Microwave Imager, expected to be in orbit in late 1985, are described. It is recommended that data from that instrument be processed to a form suitable for research applications and archived in a readily accessible form. The report concludes with a description of the sea ice data products required for research purposes and recommendations for their archiving and distribution to the scientific community. With regard to the Antarctic, graphic and tabulated data are presented on southern ocean ice concentration; formation of the Weddell polynya; and a 10-year time series, 1973-1983, of antarctic sea ice extent. (Auth. mod.)

F-31678

Kohnen, H., **Research activities of West Germany in western Antarctica** [Die Forschungsaktivitäten der Bundesrepublik Deutschland in der Westantarktis], *Natur und Museum,* Dec. 1981 111(12), p.413-425, In German. 17 refs.

DLC QH5.S4

German expeditions in the Antarctic are briefly reviewed, as are the political and research conditions under the Antarctic Treaty. Maps of Antarctica and its surrounding waters and islands, profiles of the antarctic ice sheet, and a sketch of gondwanaland showing the tectonic drifting of Antarctica are provided. The antarctic climate and the mechanical and physical ice properties studied on Filchner Ice Shelf are discussed and data are tabulated.

F-31679

Bogorodskiĭ, V.V., Pozniak, V.I., **Radar measurements of snowcover thickness,** *Soviet physics. Technical physics,* May 1984 29(5), p.598-599, Translated from Zhurnal tekhnicheskoĭ fiziki, May 1984 54(5). 2 refs.

Two methods are currently employed to measure snowcover thickness: planting fixed gauges in the snow, or scooping the snow up from the ground and measuring the volume. A new method, demonstrated in 1981 in studies of the structure and thickness of snow strata on the surface of an antarctic glacier, is reviewed. Experiments show that radar also provides an effective method for measuring snowcover thickness at moderate latitudes.

F-31680

Wacker, J.F., Anders, E., **Trapping of xenon in ice: implications for the origin of Earth's noble gases,** *Geochimica et cosmochimica acta,* Nov. 1984 48(11), p.2373-2380, Refs. p.2379-2380.

Although the earth's atmosphere contains Ne, Ar, and Kr in about C1,2-chondrite proportions, Xe is depleted about 20-fold. To test the suggestion that the 'missing' Xe is trapped in antarctic ice, distribution coefficients have been measured for Xe in artificially formed frost at -20 to -60 deg C, using Xe-127 tracer. The values are 0.098 cc STP/g atm for trapping and <5 cc STP/g atm for trapping plus adsorption. If these results are representative of natural ice, then the antarctic ice cap contains less than 1% of the atmospheric Xe inventory, or <1/1,000 the amount needed for a C1,2-chondrite pattern. (Auth. mod.)

F-31681

Koide, M., Bertine, K.K., Chow, T.J., Goldberg, E.D., **Pu-240/Pu-239 ratio, a potential geochronometer,** *Earth and planetary science letters,* Jan. 1985 72(1), p.1-8, 14 refs.

The arctic and antarctic ice sheets maintain records of the atmospheric fallout in their datable strata. The Pu-240/Pu-239 ratios in these polar reservoirs uniquely distinguish particulate fallout from the pre-moratorium nuclear atmospheric weapons tests, dominated by the U.S., and the post-moratorium atmospheric weapons tests, dominated by the USSR. Thus, they offer the possibility of use as a geochronological tool for some marine, glacial, lacustrine and soil systems. (Auth.)

F-31682

Wolff, E.W., Peel, D.A., **Record of global pollution in polar snow and ice,** *Nature,* Feb. 14-20, 1985 313(6003), p.535-540, 122 refs.

Studies on polar snow and ice show evidence for a twofold increase in the concentration of methane in the atmosphere over the period since 1650, but its interpretation in terms of increases in sources under human control is still controversial. A pre-industrial CO2 concentration of 260 p.p.m.v. has been determined, compared with a present-day concentration of 340 p.p.m.v. The pre-industrial value is significantly smaller than that assumed until recently in models of CO2-induced warming of the atmosphere. Concentrations of sulphate and nitrate in Greenland snow have increased threefold and twofold, respectively, in the last century. In contrast, no recent increases have been detected for these acidic species in Antarctica. This reflects the geographical pattern of industrial emissions and the restricted movement of tropospheric aerosols between the hemispheres. Similarly, much larger surface snow concentrations of heavy metals are found in Greenland than in Antarctica.

F-31687

McKay, C.P., Clow, G.D., Wharton, R.A., Jr., Squyres, S.W., **Thickness of ice on perennially frozen lakes,** *Nature,* Feb. 14-20, 1985 313(6003), p.561-562, 28 refs.

The dry valleys of southern Victoria Land, constituting the largest ice free expanse in the Antarctic, contain numerous lakes whose perennial ice cover is the cause of some unique physical and biological properties. Although the depth, temperature and salinity of the liquid water varies considerably from lake to lake, the thickness of the ice cover is remarkably consistent, ranging from 3.5 to 6 m, which is determined primarily by the balance between conduction of energy out of the ice and the release of latent heat at the ice-water interface and is also affected by the transmission and absorption of sunlight. In the steady state, the release of latent heat at the ice bottom is controlled by ablation from the ice surface. Here we present a simple energy-balance model, using the measured ablation rate of 30 cm/yr, which can explain the observed ice thickness. (Auth.)

F-31690

Whillans, I.M., Grootes, P.M., **Isotopic diffusion in cold snow and firn,** *Journal of geophysical research,* Apr. 20, 1985 90(D2), p.3910-3918, Refs. p.3917.

Molecular mixing in cold snow and firn is ordinarily controlled by vapor diffusion. Diffusion through or along the ice matrix is slow, whereas diffusion from the air to within separate grains is comparatively rapid. Thus mixing occurs in the vapor phase, and exchange with the local ice involves all the water molecules. A quantification of these concepts is applied to the diffusion of oxygen-isotopic depth profiles in southern Greenland and at Dome C, Antarctica. It successfully describes the smoothing of measured profiles. The smoothing rate is strongly dependent on temperature and density of the firn.

F-31693

Cordonnier, C., **Preliminary study of antarctic iceberg towing to Atacama province, Chile** [Etude préliminaire sur le remorquage d'icebergs antarctiques vers la province d'Atacama au Chili], *Il Polo,* March 1985 41(1), p.9-11, In French. 6 refs.

The possibility of towing antarctic icebergs to Antofagasta, Chile, is explored, taking into consideration the relatively short voyage, the favorable currents, and the low water temperature. The practical aspects and the economic advantages of icebergs as a fresh water source are discussed.

F-31694

Hoffman, J.S., **Estimates of future sea level rise,** Greenhouse effect and sea level rise; a challenge for this generation, Edited by M.C. Barth and J.G. Titus, New York, Van Nostrand Reinhold, 1984, p.79-103, Refs. p.101-103.

DLC GC89.G74

The approach used for estimating sea level rise is presented, and future atmospheric composition, global temperature, and ocean glacial responses to global warming are discussed and tabulated. It is suggested that meltwater will contribute to crevassing and ice softening which could accelerate the deglaciation of the ice sheets. In Antarctica, deglaciation is likely because large parts of antarctic ice fields, being below sea level, are subject to rapid collapse. The speed of deglaciation will depend on such factors as ocean currents, the fractional coefficients of the "surging" ice, and the specific topography of pinnings and outlet channels.

F-31706

Romanov, A.A., **Sea ice of the southern ocean and navigation conditions** [L'dy IUzhnogo okeana i usloviia sudokhodstva], Leningrad, Gidrometeoizdat, 1984, 88p. + charts, In Russian. Refs. p.85-88.

The first chapter of this book describes the physical and geographic characteristics of the southern ocean, including the atmospheric circulation and meteorological conditions in the area. Ch. 2 describes the formation and development of sea ice, including the dynamics of drifts, fast ice, icebergs and polynyas. In Ch. 3, the structural and physico-mechanical properties of antarctic ice are discussed, while chapters 4 and 5 consider the effects of prevailing conditions on navigation in the area, such as the icing of ships, the danger of collision with icebergs, etc.; recommendations for dealing with such dangers are made. Data gathering and dissemination, and services available to ships are described. Twenty-four tables and 59 maps are given, including those showing the seasonal minimal and maximal ice extent, the monthly estimation of ice age and ice distribution.

F-31710

Muszynski, I., Birchfield, G.E., **Dependence of antarctic accumulation rates on surface temperature and elevation,** *Tellus,* Mar. 1985 37A(2), p.204-208, 25 refs.

A study of antarctic accumulation, surface temperature and elevation data reveals a strong correlation between the accumulation rate and the surface temperature which, in turn, is almost uniquely determined by the elevation of the ice sheet surface. The latitudinal temperature gradient seems to play a relatively minor role. The dependence of the accumulation rate on surface temperature and elevation is, to a very good approximation, linear. Two parameterizations of the accumulation rate are proposed for use in simple one-dimensional paleoclimatic models. (Auth.)

F-31720

Legrand, M.R., Delmas, R.J., **Ionic balance of antarctic snow: a 10-year detailed record,** *Atmospheric environment,* 1984 18(9), p.1867-1874, 35 refs.

The concentrations at the 1-100 ng/g level of seven major ions of South Pole snow were determined in 100 samples representing the continuous time period 1959-1969. The ionic balance in South Polar snow is achieved for the first time and the existence of the three strong mineral acids H2SO4, HNO3 and HCl is demonstrated. With the aid of the clear seasonal patterns exhibited by the depth profiles of several of the measured ions, the different natural sources contributing to the aerosol at the South Pole are reviewed. These include sea spray, volcanoes, biogenic activity and nitrogen fixation. (Auth.)

F-31721

Boutron, C., Leclerc, M., Risler, N., **Atmospheric trace elements in antarctic prehistoric ice collected at a coastal ablation area,** *Atmospheric environment,* 1984 18(9), p.1947-1953, 33 refs.

Results of an analysis of 22 elements or compounds in a large block of prehistoric blue ice more than 12000 years old, collected at a coastal ablation area in east Antarctica, are presented. Successive veneer layers chiselled in sequence from the exterior to the center have been analysed separately in order to determine the contamination characteristics of the block. Concentrations measured in the central parts probably represent the original concentrations in the prehistoric blue ice, thus giving estimates of pre-man natural reference levels of these elements or compounds in antarctic precipitations. For the enriched elements Cd, Cu, Zn, Au, Se and for SO4, concentrations are shown not to differ significantly from those presently observed in surface snow in the central plateau areas from which the ice is thought to originate. This suggests that the remote polar regions of the Southern Hemisphere are still little affected by global pollution for these elements and for S compounds. For crustal derived elements, concentrations in prehistoric ice are found to be significantly higher than those in present day snow; this confirms that crustal flux to the Antarctic continent was higher during Wisconsin times than now. (Auth.)

F-31733

Khokhlov, G.P., **Distribution of electrical parameters in upper layers of shelf, land, and fast ice near Novolazarevskaya Station,** *IEEE journal of oceanic engineering,* Dec. 1984 OE-9(5), p.360-365, 7 refs.

Presented are the results of an experimental investigation of electrical parameters of glacier ice and first-year fast ice in the VHF frequency band, at the antarctic station Novolazarevskaya in the 27th Soviet Antarctic Expedition (1982-1983). Distributions of electrical parameters in the glaciers are obtained for ice, firn-ice, and cold-firn zones. These zones differ from each other in the physical characteristics of their upper layers in the glacier. The results of the measurements show the difference in distributions for these zones as well as the significant variability of the refractive index and the specific attenuation in the firn-ice and cold-firn zones. (Auth. mod.)

F-31741

Oerlemans, J., **Ice-sheet modelling for climate studies,** Paleoclimatic research and models: report and proceedings of the workshop held in Brussels, December 15-17, 1982. Edited by A. Ghazi, Dordrecht, D. Reidel, 1983, p.157-163, Refs. p.163.

DLC QC884.P34

Ice-sheet response to changing environmental conditions is discussed. A schematic picture showing a north-south cross section of a Northern Hemisphere ice sheet, and a typical steady-state diagram for bounded ice sheets of Greenland and Antarctica are presented and analyzed. A numerical model is applied to the Antarctic Ice Sheet which contains the essential mechanism leading to the ice-thickness variations observed.

See also:
A-29239 A-29926 A-30806 A-31031 A-31242 A-31306
A-31399 B-29456 B-29457 B-29968 B-30357 B-30535 B-30536
B-30537 B-30833 B-30888 B-30889 B-30893 B-30894 B-31161
B-31162 B-31241 B-31256 B-31277 B-31278 B-31579 B-31714
B-31715 B-31735 B-31744 B-31747 C-29601 C-29602 C-29702
C-30151 C-30408 C-30807 C-30876 C-31157 C-31168 C-31454
C-31609 C-31616 D-29469 D-30993 E-28962 E-28963 E-28974
E-29041 E-29079 E-29111 E-29136 E-29199 E-29280 E-29292
E-29413 E-29416 E-29418 E-29419 E-29423 E-29424 E-29425
E-29427 E-29491 E-29588 E-29605 E-29608 E-29695 E-29737
E-29868 E-29920 E-29937 E-29985 E-30144 E-30145 E-30146
E-30159 E-30236 E-30388 E-30389 E-30393 E-30394 E-30395
E-30397 E-30448 E-30451 E-30459 E-30472 E-30732 E-30917
E-30929 E-30996 E-30999 E-31000 E-31396 E-31621 E-31655
E-31731 G-29042 G-29099 G-29316 G-29406 G-29657
G-29731 G-30870 G-30877 G-30972 G-31167 G-31238
G-31355 G-31356 G-31474 G-31515 G-31520 G-31521
G-31523 G-31578 G-31708 I-28999 I-29101 I-29148 I-29165
I-29167 I-29231 I-29235 I-29260 I-29502 I-29647 I-29698
I-29726 I-29813 I-29861 I-29934 I-30020 I-30032 I-30105
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I-30753 I-30802 I-30872 I-30933 I-31069 I-31102 I-31107
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J-31240 J-31435 J-31613 K-30882 L-29613 L-29652 L-30398
L-30620 L-30879 L-31614

G. LOGISTICS, EQUIPMENT & SUPPLIES

G-28987

Brune, [illegible]., **Sinking of the *Gotland II*** [Untergang der *Gotland II*], *Hansa,* Feb. 1982 119(3), p.189, In German.

The German cargo vessel *Gotland II,* carrying supplies and materials for the Georg-von-Neumayer Station, was beset in Yule Bay off northern Victoria Land, began taking water, and sank on December 18, 1981. This item details the events of December 17th and 18th, as given in the Captain's report, up to 18/1745 hours when the ship went down.

G-28988

Klages, W., **Radio communication with the Antarctic via satellite** [Funkverbindung mit der Antarktis über Satelliten], *Hansa,* Feb. 1982 119(4), p.258-259, In German.

The brief report tells of the communication systems used at Atka Iceport in support of the German expedition there in 1981. The equipment, its capabilities, special functions, and range are given and some of the satellites used and the kinds of data available are mentioned.

G-29002

Wolff, U., **Trends in international ice navigation** [Entwicklungstendenzen in der internationalen Eisschiffahrt], *Seewirtschaft,* May 1983 15(5), p.223-228, In German. 10 refs.

Development in ice navigation, while mostly tested and used in arctic conditions, hold especial significance for the Antarctic. Ships operating in the antarctic environment are used not only as icebreakers and supply vessels but also as platforms for a variety of research programs above, at, and below the ice surface. Data on the number and tonnage of icebreakers and other icegoing vessels are listed and discussed.

G-29042

Harbron, J.D., **Modern icebreakers,** *Scientific American,* Dec. 1983 20(6), p.49-55.

A review is given of modern seagoing icebreaking/research vessels and their areas of operations. Most of these currently in use were designed and built at the Wärtsilä shipyard in Helsinki. In some icebreaker designs, Wärtsilä includes a bubbler system to prevent besetting. Major operating areas are the arctic regions, the Great Lakes, and the oceans surrounding Antarctica. Northern lakes and rivers are served by smaller types of icebreakers. Design features are discussed and drawings illustrate some of the icebreaker types.

G-29099

Jezek, K.C., Roeloffs, E.A., **Measurements of radar wave speeds in polar glaciers using a down-hole radar target technique,** *Cold regions science and technology,* Oct. 1983 8(2), p.199-208, 17 refs.

A new technique for measuring the speed of radar waves in polar ice sheets was developed to investigate a previously reported disagreement between the permittivities of laboratory and glacier ice. The technique involves lowering a cylindrical radar target to several carefully measured depths in a borehole and measuring the travel time of a radar wave transmitted from a surface radar unit to the target in the borehole. The experiment was performed at Dome C, East Antarctica, and Dye-3, Greenland, and useable data were collected for target depths between 200 and 800m. After computing the range to the target along a straight ray path and after correcting the travel time for delays in in the radar receiver, the velocities determined from these experiments were found to be in good agreement with the velocities predicted by Robin's empirical formula. The apparent discrepancy between the permittivity of glacier ice, as measured using the radar wide-angle reflection method, and laboratory ice now seems to be due in large part to signal delay in the radar receiver that was ignored in earlier experiments. (Auth.)

G-29175

Polar research and supply ship *Polarstern* placed in service [Polarforschungs- und Versorgungsschiff *Polarstern* in Dienst gestellt], *Meerestechnik,* Feb. 1983 14(1), p.29-31, In German.

The nearly simultaneous putting into service of *Polarstern* and the cornerstone laying of the Alfred-Wegener-Institut für Polarforschung is noted. The ship, its facilities, accommodations, and capabilities are described. The schedule for *Polarstern's* first 18 months of operation is laid out.

G-29176

Construction start of the Alfred-Wegener-Institut für Polarforschung [Baubeginn am Alfred-Wegener-Institut für Polarforschung], *Meerestechnik,* Feb. 1983 14(1), p.31-32, In German.

With the groundbreaking for the Alfred-Wegener-Institut für Polarforschung in 1980, the realization of a 10-year dream was begun. A long tradition of German research in both polar regions is noted and briefly described and some of the shores visited by german seamen and scientists are mentioned. Highlights of the planning stages for the institute are recounted and its facilities, capabilities for research and education, responsibilities, and cooperative programs with other research institutions are outlined.

G-29208

U.S. Naval Support Force, Antarctica, **CNSFA Operation Order No.1-YR [84],** n.d., Var. p., Numerous refs.

The operation order is composed of Annexes A through K and Appendices I through XIII. The Appendices are not included in this item. Annexes A through K lay specific tasks and responsibilities on the units or individuals designated in the separate annexes. Annex A is Operations; B is Logistics; C, Communications; D, Public Works; E, Administration; F, Medical/Dental; G, Field Operations; H, Terminal operations; I, Detachment Christchurch; J, Winter Over Tasking; K, Port Hueneme Representative Tasking.

G-29217

SCAR Working Group on Logistics, **Antarctic telecommunications guidance manual SCARCOM, Vol. 1, Telecommunications in Antarctica, Vol. 2, Operator's handbook,** 1983, Var. p.

The two volumes constitute the second edition of the publication, updating and superseding the issuance of 1968. Volume one presents historical background on telecommunications quality and problems in Antarctica. It also discusses the roles of the Consultative Parties, the WMO, Antarctic Treaty resolutions, and other resolutions in finding ways to improve communications. Volume two is an operator's handbook which gives details of the kinds of services available and how to use them; distress and emergency procedures; traffic procedures; circuit control; codes; meteorological messages; message formats; schedules; equipment; and station call signs, frequencies, operation times, and antenna details.

G-29221

Hirayama, Z., **Introduction to Showa Station—(5): Buildings,** *Polar news,* Aug. 1983 No.37, p.45-57, In Japanese.

More than a quarter century has passed since Showa Station of the Japanese Antarctic Research Expedition was erected at Ongul Island in 1957. During this period the total floor area of building has been expanded to 4,500 sq m from an original 136 sq m as research activities increased over the years. Meanwhile, the type of building has also changed from laid buildings attached directly to the ground to elevated buildings which prevents the effect of snow drifts against the structures through the means of a pre-fabrication system. The scale of the buildings has also been stepped up from 40 sq m to 100 sq m standard units and the largest building is the new power station having 425 sq m. Details are given of 4 typical buildings: No. 1 living hut, the observation hut, No. 9 living hut and the environmental science laboratory hut. (Auth.)

G-29281

Henderson, G.R., Dayton, C.M., **CEC and Seabee's involvement in Antarctica,** *Navy civil engineer,* Fall 1983 23(3), p.16-20.

A review is given of the CEC's and Seabee's experience in Antarctica operations from their participation in Operation Highjump and the IGY through the present day. Highlights of construction projects are noted including the annual preparation of the ice runway, maintenance of the snow runway, construction and closing of the nuclear power plant, upgrading of the various buildings at the four U.S. bases, maintaining a large fleet of snow vehicles and utilities systems among many others. Organizational changes necessitated by changes of mission and responsibilities either by expanding or decreasing are traced. More recent activities are also noted such as the construction of the McMurdo ice wharf, relocating navigational aids as the ice shelf moves seaward, and preparing the runway for the WINFLY operation.

G-29282

Thomas, V.C., Jr., **Frozen assets,** *Sea power,* Dec. 1983 26(13), p.52-60.

A brief review is given of the icebreaker history of the U.S. beginning with the *Bear;* through the *Wind* class of 1944 (two of the four are still operating in the mid-1980s); *Burton Island, Edisto,* the second *Northwind,* and *Glacier* of the 1950s; to the *Polar Star* and *Polar Sea* of the 1970s. Always there was and is too much to do and too little to do it with and stringent funding from the Congress. Comparisons are made of icebreaking capabilities between those of the U.S. and those of Canada and the USSR. The increased commercial and strategic importance of both polar regions is pointed out and possible diminished influence of the U.S. in the antarctic scientific programs could result from deficiencies in icebreaking capabilities.

G-29308

German research aircraft successfully tested, *Meerestechnik,* Nov. 1983 14(4), p.122.

Both Dornier support aircraft, the Do 128-6 (Polar 1) and the Do 228-100 (Polar 2), are twin turbo-prop engine, high winged monoplanes with wheel and ski landing gear. Polar 1 is equipped with weather radar, a deicing system, and a survival kit for 20 days; Polar 2 has ice measuring radar, a magnetometer, and a serial camera. Both aircraft have been field tested in Germany and Greenland and declared suitable for work in Antarctica. Both will be part of the German Antarctic Expedition scheduled to depart Germany in Dec. 1983.

G-29316

Hoffman, C.R., comp, **Engineering manual for McMurdo Station, 2nd ed,** Port Hueneme, Calif., Civil Engineering Laboratory, 1979, var. p., ADA-135 104, Numerous refs.

This document presents engineering methods and operational procedures that have proved successful in working with the terrain and environmental features in the vicinity of McMurdo Station. Experience, and directly applied research in the McMurdo area, have provided the basis for the manual. Contents: Physiography of the McMurdo Area; McMurdo Ice Shelf; Sea-Ice Sheet; Properties of Snow, Ice, and Permafrost; Building Design and Maintenance; Utility Distribution System; Airfields and Roads; Ship Offloading Facilities; Pollution Control; Transportation and Construction Equipment; Materials for Low Temperature Use; Annotated References to Publications on Cold-Weather Construction. Many individual pages have been revised in part, some completely, and chapter annexes are additional papers which have been selected from the various series of the Naval Civil Engineering Laboratory technical publications. (Auth. mod.)

G-29360

Neville, A., **Concrete in the Antarctic,** *Concrete,* Jan. 1984 18(1), p.27.

The author, a Professor and Principal at the University of Dundee, visited the South Shetlands and Graham Land to observe the uses and condition of concrete in those cold regions. His brief report tells of the numerous instances of damaged materials, faulty construction, and sub-standard practices he found there.

G-29392

Easton, M., **Reconstruction of Scott Base, Ross Island, Antarctica,** *New Zealand antarctic record,* 1983 5(2), p.23-26.

Original buildings were of temporary construction designed to meet the needs of IGY personnel. As scientific programs continued and expanded so also did the buildings, to the point that they became too expensive to maintain. A refurbishing and reconstruction plan was developed to modernize the base. Elements of the plan are given along with the philosophy which determined the direction that construction would take. Details are given of the erection of the Summer Laboratory, otherwise known as Stage 1, and other buildings in the redevelopment plan.

G-29406

Hidaka, H., Tatsukawa, R., **Environmental pollution of chlorinated hydrocarbons around Showa Station,** *Antarctic record,* Dec. 1983 No.80, p.14-29, In Japanese with English summary. 26 refs.

DDT, PCB and HCH levels in air, snow, sea water, fish, benthic invertebrates, etc. were determined and the possibility of leakage of these compounds from the station is discussed. Chlorinated hydrocarbon concentrations and compositions in snow were similar in the samples at Tottuki Point and those to windward of Mizuho Station. Concentrations of these chemicals in sea water samples taken at Tottuki Point and near Showa Station were at the same level though the compositions of PCB isomers and congeners were somewhat different. Taking water current under ice into consideration, it is assumed that Tottuki Point is still unpolluted from Showa Station. However, PCB and DDT concentrations in benthic fish collected near Showa Station were about thirty times and twice higher, respectively, than those at Tottuki Point. It is concluded that benthic organisms near Showa Station are polluted considerably by PCB and slightly by DDT from the station activities, although the PCB and DDT levels in these fish are low compared with those in other oceans. In order to prevent the pollution from station activity, stricter waste disposal procedures will be necessary. (Auth. mod.)

G-29476

U.S. Navy. Antarctic Development Squadron Six, **Operation Deep Freeze 84: end of season report,** March 1984, var. p., 2 refs.

The squadron organization is outlined, the ten elements comprising the mission of the squadron during the operation are listed, and the inventory of aircraft used is shown. A chronology of significant events from Aug 1983 through Feb 1984 is given. Details of activities along with problems encountered and recommendations are given in the areas of operations, maintenance, logistics, administration and personnel, communications, medical and dental care, the detachments, and safety/NATOPS.

G-29481

Comerci, S.M., **Antarctic archeology. Argentine activities on Snow Hill Island during the antarctic campaigns 1979-80 and 1980-81** [Arqueología antártica. Los trabajos de la República Argentina en la isla Cerro Nevado durante las campañas antárticas 1979-80 y 1980-81], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.291, 25p., In Spanish.

Described is an Argentine antarctic expedition whose object it was to rescue a building, equipment and personal property left behind in 1903 by a Swedish expedition under the leadership of Otto Nordenskjöld. The items are listed and photographed. They are intended to become part of a museum collection.

G-29657

Aver'ianov, V.G., Klokov, V.D., Kliuchnikov, G.IA., Korotkevich, E.S., Petrov, V.N., **Development of scientific principles and realization of a complex of actions necessary for building, in Antarctica, snow landing strips for wheeled airplanes** [Razrabotka nauchnykh osnov i osushchestvlenie kompleksa meropriiatiĭ po sozdaniiu v Antarktide snezhnykh vzletno-posadochnykh polos dlia kolesnykh samoletov], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.131-138, In Russian. 10 refs.

Results of extensive engineering and glaciological studies and experiments for building runways in deep snow are presented. Technical problems are pointed out, and some solutions are suggested for working the ice cover surface and for packing and consolidating deep snow, based on experiments at different temperatures and amounts of moisture. In 1980, the first snow runway was built at Molodezhnaya Station and regular flights to and from the Soviet Union and Antarctica were established.

G-29659

Shirshov, V.E., Gindin, L.G., **Provisions for Soviet antarctic expeditions** [Obespechenie rabot Sovetskikh antarkticheskikh ekspeditsiĭ], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.149-158, In Russian.

Provisions for Soviet antarctic expeditions, consisting of scientific, electrical and transportation equipment, supplies, housing, radios, etc., have increased considerably over the past 25 years. While the first five expeditions carried only 28.5 tons of provisions, expeditions 21 through 25 carried more than 42 tons. Equipment used in air and land transportation operations is listed. In the course of 25 years, more than 8 thousand men participated, and 160 tons of supplies were carried to Antarctica, in 25 expeditions).

G-29708

Foster, M.E., comp, Jones, G.M., comp, **History of the PM-3A nuclear power plant McMurdo Station, Antarctica,** Port Hueneme, California, Naval Energy and Environmental Support Activity, 1982, Var. p., Refs. passim.

The history of the McMurdo power plant is given from 1960 when the plant was authorized and funded by Congress, through the construction, operation, and eventual shutdown in 1972. It was in operation for about ten years, producing 78 million kilowatt hours of electricity with an availability of about 72%. Excerpts from the operating manuals are compiled including drawings, the radioactive waste materials disposal system, and safety procedures. Appendices give reproductions of inter-agency agreements, the Antarctic Treaty, lists of personnel involved, operating history, and the removal plan.

G-29731

Fedotov, V.I., **Using drift snow for sea pier construction in Antarctica** [O vozmozhnosti ispol'zovaniia metelevogo perenosa pri sozdanii morskogo prichala v Antarktike], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.37-38, In Russian. 10 refs.

Navigation and docking hazards in the Antarctic are reviewed, as are cases where ice was used in the construction of wharfs on the antarctic coast. The practicality of using accumulated snow for such purpose is explored.

G-29792

New Japanese icebreaker, *Navy international,* Jan. 1983 88(1), p.38-40, The article first appeared (in Japanese) in the Japanese naval journal Sekai no kansen, No.318: 80-89, Feb. 1983.

The Japanese icebreaker *Fuji* has been in antarctic service for 17 years and is scheduled for imminent decommissioning. The replacement icebreaker *Shirase* was completed in 1982 and participated in the Japanese antarctic summer season in 1983. Both vessels are similar in design but *Shirase* is about 30% larger overall and will serve as icebreaker, transporter of goods and people, helicopter carrier, and ocean survey ship. Details are outlined of *Shirase's* general arrangement, icebreaking capabilities and philosophy, hull equipment, power plant and propulsion equipment and ocean survey gear.

G-29821

Gruzov, E.N., **Provisions for hydrobiological diving operations in Antarctica** [Vodolaznye gidrobiologicheskie raboty v Antarktide i ikh obespechenie], *Akademiia nauk SSSR. Dal'nevostochnyĭ nauchnyĭ tsentr. Institut biologii moria. Sbornik rabot,* 1982 No.25, p.57-67, In Russian.

Preparations for hydrobiological diving operations carried out in Antarctica during 1968-1972 summer and winter seasons are reviewed. Organizational aspects regarding the selection of the diving area, transportation, supplies, equipment and data, such as water temperature and related factors, are discussed. The difficulties arising from the harshness of the climate are pointed out.

G-29864

Dornier, GmbH, Friedrichshafen, Federal Republic of Germany, **Dornier 128 & 228 Antarctica,** 1984, 8p.

Dornier has updated two small aircraft for support work to the German Federal Republic scientific research program in Antarctica. In this brochure details are given of weight, passenger/cargo capacities, speed, range, and take-off distance among others and built-in scientific measuring instrumentation and navigational equipment. Ferrying and emergency equipment is listed and the ferry route from

Germany to the Antarctic and antarctic operational areas are shown on charts.

G-29927
McKnight, J.D., Robinson, W.H., **Air water solar heater,** *Energy journal,* Oct. 1983 56(10), p.5-10, 5 refs.

A solar collector is described which heats water by convectively cycling solar heated air over an air-water heat exchanger. Such a collector is simpler to make and is possibly cheaper than a conventional collector, also it is not susceptible to frost damage. The prototype air-water heater was tested in Antarctica and this was followed by experimental work leading to the development of a unit suitable for a domestic installation. A test of a domestic solar water heating system with collection areas of 6 sq m and 8 sq m of air-water heaters is described. (Auth.)

G-29983
Draczkowski, T., **Experience of Polish ocean lines in the service of antarctic expeditions** [Doświadczenia polskich linii oceanicznych w obsludze wypraw Antarktycznych], *Technika i gospodarka morska,* Nov. 1981 31(11), p.569-572, In Polish.

DLC VK4.T4

The history of international cooperation in Antarctica, the Antarctic Treaty, the national interests in Antarctica in general, and those of Poland in particular, are reviewed. Polish activities during marine expeditions around South Shetland Islands and investigations at Arctowski Station, especially concerning Admiralty Bay on King George Island, are described.

G-30140
U.S. Coast Guard, Honke, F.J., **Deep Freeze 1984 Cruise Report,** Mobile, AL, May 1984, var.p.

This report covers the period from *Westwind's* departure from Mobile on Oct. 4, 1983, and pertinent pre-deployment events, to the return to Mobile on Feb. 25, 1984. Included are numerous photographs, a chronological list of major events, a narrative of operations, and description of equipment, food and medical supplies, logistics and public relations.

G-30211
Augstein, E., Junghans, H.G., Kottmeier, C., Miller, H., Reinwarth, O., Wagenbach, D., **Observatories of the Georg-von-Neumayer Station,** *Berichte zur Polarforschung,* Mar. 1984 Special issue No.5, 15p.

The German wintering-over station in Antarctica serves among others as a basis for continuous seismic, gravity, geomagnetic, meteorological and air chemical observations. The technical background of the functions of the Georg-von-Neumayer-Station is delineated. (Auth.)

G-30269
Akimov, V., **Antarctic navigation** [Itogi antarkticheskogo plavaniia], *Morskoĭ sbornik,* Dec. 1983 No.12, p.76-80, In Russian.

A five-month voyage of two USSR Navy research vessels, the *Admiral Vladimirskiĭ* and the *Faddeĭ Bellinsgauzen,* circumnavigating Antarctica, is reported. Oceanographic investigations were carried out aboard the ships and with the aid of a helicopter, with the object of defining the difficulties of antarctic navigation in stormy and icy seas. A map showing details of the traverse is included. The mass of data recorded will be evaluated later, but their hydrographic and other values for antarctic navigation is already considered significant.

G-30324
USCG *Polar Sea* (WAGB-11) Deep Freeze 84, U.S. Coast Guard, June 1984, 111p.

An account is given of the *Polar Sea's* cruise, departing Seattle on Oct. 19, 1983 and returning there May 17, 1984, including a circumnavigation of South America via the Panama Canal and operations in antarctic waters. Activities are described and recommendations are made in many of these categories: ship operations, air operations, navigation, communications, science, engineering, administration, supply/logistics, public relations, and personnel embarked.

G-30328
U.S. Congress. House. Committee on Merchant Marine and Fisheries. Subcommittee on Coast Guard and Navigation, **Domestic and polar ice-breaking operations: hearings before the Subcommittee on Coast Guard and Navigation of the Committee on Merchant Marine and Fisheries, House of Representatives, Ninety-eighth Congress, Second Session, 1984,** Washington, U.S. GPO, 1984, p.1-22. Serial No. 98-35.

Witnesses appearing before the Committee testified on various aspects of icebreakers and ice breaking, including the size and construction of the Coast Guard's icebreaker fleet now in the inventory; whether that fleet can fulfill its assigned tasks; the commitment to research programs in Arctic and Antarctic regions and how icebreakers relate to these programs; research and development of new icebreakers; differences between Arctic and Antarctic research; aspects of the St. Lawrence Seaway and the debate between extending the shipping season there or keeping the Great Lakes open year round by using icebreakers.

G-30330
New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic field manual,** Christchurch, 1984, 79p.

The manual is designed to aid researchers and support personnel in carrying out their projects efficiently and safely. Specific topics are discussed in four categories: field travel and safety; field planning and logistics; field communications; and place names in New Zealand and Australian Antarctic territory.

G-30348
Andreas, E.L., Rand, J.H., Ackley, S.F., **Simple boom assembly for the shipboard deployment of air-sea interaction instruments,** *Ocean engineering,* MP 1752, 1984 11(3), p.227-237, For another source see 38-868 or 13G-28929. 21 refs.

We have developed a simple boom for use in measuring meteorological variables from a ship. The main structural member of the boom, a triangular communications tower with rollers attached along its bottom side, is deployed horizontally from a long, flat deck, such as a helicopter deck, and will support a 100-kg payload at its outboard end. The boom is easy to deploy, requires mimimal ship modifications, and provides ready access to the instruments mounted on it. And because it is designed for use with the ship crosswind, oceanographic work can go on at the same time as the air-sea interaction measurements. We describe our use of the boom on the *Mikhail Somov* during a cruise into the Antarctic sea ice and present some representative measurements made with instruments mounted on it. Theory, experiment, and our data all imply that instruments deployed windward from a rear helicopter deck can reach air undisturbed by the ship. Such an instrument site has clear advantages over the more customary mast, bow, or buoy locations. (Auth.)

G-30489

U.S. National Science Foundation. Division of Polar Programs, **Survival in Antarctica, 1984 edition,** Washington, 1984, 101p., 24 refs.

This manual, in a format suitable for pocket or pack, covers survival techniques under the following headings: physiological problems; clothing; basic pointers; shelters; overland travel; crevasses; emergency landing on land; survival on sea ice and at sea; fire; and wintering over. Signals, weather warnings and cache and shelter locations are given.

G-30509

Kohnen, H., comp, **Safety and survival on polar expeditions** [Sicherheit und Überleben bei Polarexpeditionen], Berichte zur Polarforschung, Sonderheft No.3, Bremerhaven, Alfred-Wegener-Institut, 1983, 36p. + Addendum 1, July 1984.

This small booklet covers safety aspects when working on the continent, on the sea or sea ice, and in aircraft operations and survival in these environments when an accident occurs. It discusses such topics as blackout, whiteout, fire, snow blindness, frost bite, wind chill, emergency shelters, traverse procedures, emergency landings on ice, coping with sea ice, accidents at sea, rules for working aboard *Polarstern,* working with helicopters, and, in Addendum No.1, safety when working around fixed wing aircraft.

G-30510

JSE Brabant Island 1983-85, June 1984, 30p.

This is a preliminary report of the expedition summer party which had the dual purposes of making scientific observations in several study areas and testing and evaluating various types of cold weather clothing and equipment. Some data are given on projects in botany, ornithology, mammals (seals), invertebrates, psychology, meteorology, geodetic survey, and geology and geomorphology. Twenty-two categories of clothing and equipment were used and brief evaluations are given. Intentions of the wintering party, which plans to winter over in tents, are listed.

G-30562

Lasorsa, D.P., Bresnahan, D.M., **Snowcraft/survival school: learning to work in Antarctica,** *Antarctic journal of the United States,* June 1984 19(2), p.5-9.

The school is organized and conducted to teach field parties how to function in the cold while wearing heavy clothing. Researchers are taught the art of survival using ropes, ice axes, tents and other gear and equipment. Shelter building, mountaineering, weather, situation handling, and environmental hazards are among the courses taught to field parties. Techniques for coping with the very different and difficult camping problems encountered in the dry valleys are also taught.

G-30565

Chiang, E., **INMARSAT: a new communication system for McMurdo Station,** *Antarctic journal of the United States,* June 1984 19(2), p.14.

The new International Maritime Satellite (INMARSAT) communication system is described, its limitations are pointed out, and how it will be used at McMurdo is explained.

G-30590

Shabad, T., **Activities of the 28th Soviet Antarctic Expedition,** *Polar geography and geology,* Apr.-June 1983 7(2), p.169-171.

A brief account of the work of Soviet ships in the Antarctic in 1982-1983 is given. It is reported that the hydrographic expedition to the Antarctic is completed and a few changes in location of a number of mapped features are reviewed.

G-30767

Schrader, G., **Polar clothing from a thermophysiological viewpoint** [Polarbekleidung unter thermophysiologischem Gesichtspunkt], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.103-106, In German with English and Russian summaries. 14 refs.

Emphasis is given to the importance of clothing for thermoregulation of the human body in cold climates. Aetiology, symptoms and genesis were investigated in detail in relation to local damage done by the cold. The demands are shown which are asked of polar clothing. Problems of humidity under the clothing and its removal are noted. This article is intended to alert members of expeditions to the dangers in cold climates and to show possibilities for avoiding them. (Auth. mod.)

G-30789

Pastore, F., Jr., DeSouza, M.R., **Dimensional stability of six types of Amazonian wood under adverse conditions of temperature and relative humidity** [Estabilidade dimensional de seis madeiras da Amazônia em condições adversas de temperatura e umidade relativa], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Sept. 1984 No.3, p.14-15, In Portuguese.

Laboratory tests of six types of Amazonian wood, tested for dimensional stability after various waterproofing treatments and exposed to temperatures from -25 to 102 deg C, showed cedar, *Cedrela* sp., to be the most resistant to low temperatures, and lac the best insulating medium.

G-30829

U.S. Coast Guard, **United States polar icebreaker requirements study,** [Washington, D.C.], July 1984, c200 leaves.

To promote more efficient management and operation of the nation's polar icebreaker resources, an interdepartmental study group examined polar icebreaker needs of all federal agencies through the year 2000. This analysis focused on: forecasting icebreaker requirements; assessing user alternatives; and developing financing recommendations. Portions of the report deal with such aspects as past usage, user surveys, environmental data, icebreakers of the world, commercial icebreakers, industry views and comments, polar icebreaker costs and reimbursement, and cutter employment standards. (Auth. mod.)

G-30854

Utusikov, IU.D., **Evaluating the accuracy of ship position fixing by icebergs** [K voprosu otsenki tochnosti opredeleniia mesta sudna po aĭsbergam], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.64-69, In Russian. 3 refs.

To overcome the difficulty of establishing the exact position of a ship navigating among icebergs, calculations for error determination of radar measurements, and their graphic execution, are presented.

G-30870

Leont'ev, E.B., Seleznev, P.V., **Radiobuoys on drifting icebergs** [Radiobui na dreĭfuiushchikh aĭsbergakh], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.52-54, In Russian.

Installation of three radiobuoys on icebergs within the optimum range of length (500-1200 m) and width (300-500 m) is described.

Coordinates, time of day, buoy number, and dimensions of the icebergs carrying the buoys, are tabulated. The operation, carried out on March 12, 1980, by ship and helicopter, was completed in two hours.

G-30877

Gerdau, H., Schenke, H.W., **Doppler satellite observations of point drift rates for German research stations in the Antarctic** [Doppler-Satellitenbeobachtungen zur Positions- und Bewegungsbestimmung Deutscher Forschungsstationen in der Antarktis], *Zeitschrift für Vermessungswesen,* Apr. 1984 109(4), p.161-175, In German with English summary. 12 refs.

During the three German Antarctic Expeditions 1979/80, 1980/81 and 1981/82 Doppler satellite observations were carried out with two MX-1502 receivers. The aim was to find a suitable place for projected German polar research stations on the Filchner/Ronne and Ekström Ice Shelves and to determine the drift rates of selected points. The experiences of the Doppler observations on the ice and the results of field processing are discussed and compared with the findings of the postprocessing. The drift rates of the stations were computed with data from a three-week observation period in single station solutions with broadcast ephemeris forming groups of about 60 passes. The comparison with final drift rates shows only small differences. A significant difference of more than 30 m/year in the drift rates between the two points at the Filchner Station (distance 20 km) and a large rotation angle of 5 deg was found. The drift of the Filchner/Ronne Ice Shelf is about 2.8 m/day and the Ekström Ice Shelf drifts at a rate of 0.4 m/day. (Auth.)

G-30969

Becker, R.A., **Antarctic support operations,** *Antarctic journal of the United States,* 1983 18(5), p.299-301.

During 1982-83, 222 ANS employees deployed to Antarctica. Deployment of 286 NSF grantees associated with 84 research programs was also arranged by ANS. Support responsibilities included operation and maintenance of facilities at Williams Field, some at McMurdo Station, South Pole Station, and Siple Station. In the peninsula area, ANS operated and maintained Palmer Station as well as the R/V *Hero.* Support activities provided at these locations are summarized.

G-30970

Harris, M.J., **U.S. Navy Antarctic development squadron six activities, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.301-302.

Deep Freeze 83 marked the 28th year of Antarctic Development Squadron Six (VXE-6) airlift support of U.S. scientific research projects in Antarctica. Flight operations in support of Deep Freeze 83 commenced in late August 1982 with the execution of Operation Winter Fly-In (WINFLY). Logistic and scientific support services were provided by six LC-130 aircraft, which transported fuel, cargo, and personnel to the various stations, and seven UH-1N helicopters, which provided science support. Over the season 23 patients were flown from McMurdo to Christchurch. Distinguished visitor tours proved substantial throughout deployment. Of particular note this season was the large number of science party and open field "put-ins" conducted by LC-130's. Totals are given for passengers and cargo transported during the season as well as flight hours logged. Numerous commendations have been given Antarctic Development Squadron Six for completion of a highly successful season.

G-30972

McKinna, T.G., **Ship operations, 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.304.

Two icebreakers operated in the Antarctic this season in support of the U.S. Antarctic Research Program—USCGC *Polar Star* and USCGC *Glacier.* The dry cargo ship USNS *Southern Cross* and the tankship USNS *Maumee* provided the resupply support. Ship schedules were made based on *Polar star* breaking the channel with *Glacier* nearby to assist if necessary and to support science activities in McMurdo Sound and Ross Sea. The schedules allowed for maximum utilization of ship time for science support while escorting supply ships safely in and out of McMurdo Sound. *Polar Star* circumnavigated Antarctica, visiting 14 foreign scientific stations and supporting a multidisciplinary scientific team. *Glacier* remained in the Ross Sea area conducting four separate scientific cruises. On its final departure from McMurdo, *Glacier* towed the damaged ice wharf to sea for disposal. A new wharf is to be constructed during the winter months.

G-30973

Daddario, F.A., **NSFA's homeport representative, Port Hueneme 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.305.

As in years past, the Naval support Force, Antarctica's homeport representative at Port Hueneme, California was responsible for moving passengers and cargo to the Antarctic and South America in a timely manner. Cargo operations centered around three major evolutions: Special Assignment Airlift Missions, kilo shipments, and the annual resupply vessel USNS *Southern Cross.*

G-30974

Guzman, D.J., **Detachment Christchurch 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.305.

U.S. Naval Support Force, antarctica Detachment Christchurch is a vital link in the logistical chain between the U.S. and McMurdo Station in support of the USARP. The detachment processes supplies and passengers bound for Antarctica and maintains the complex of 81 buildings that house, feed, and otherwise support transient personnel on their way to and from Antarctica. During a normal operating season the detachment handles over 200,000 recorded messages, about 1,000 high frequency voice conferences, and some 300,000 lbs of mail and issues cold weather clothing to approximately 1,300 personnel for use in Antarctica.

G-31166

Kohnen, H., **Operation of the research aircraft Polar I and Polar II in the Antarctic 1983/84** [Der Einsatz der Forschungsflugzeuge Polar I und Polar II in der Antarktis 1983/84], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.144-148, In German.

This was the first season in which the Dornier 128-6 and Dornier 208-100, Polar I and II, respectively, were used in support of the German expedition. Their performances are reviewed and evaluated. They are described as having been fruitful and successful and as having provided a higher degree of mobility to the field parties, in spite of a range/payload ratio which limited their radius of operation to about 300 km.

G-31167

Thyssen, F., Kahnt, W., **Aerial glaciological and geophysical measurements near Georg von Neumayer Station, New Schwabenland, and on the Filchner Ice Shelf near Filchner Station** [Glaziologisch-geophysikalische Flugvermessungen in der Umgebung der Georg-von-Neumayer Station, in Neuschwabenland sowie auf dem Filchner-Schelfeis in der Umgebung der Filchner-Station], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.149-155, In German. 3 refs.

Aerial measurements of tracks and locations are shown in the four figures of the report. For this reconnaissance program the DO-228 was equipped with an aerial camera, a magnetometer, VLF and Doppler navigation systems, and an electromagnetic ice thickness measuring instrument. The program, equipment operation, and results are discussed.

G-31238

Jessberger, H.L., Bässler, K.-H., **Model tests and in situ behaviour of prestressed anchors in snow and ice,** IAHR International Symposium on Ice, 7th, Hamburg, F.R.G., Aug. 27-31, 1984. Proceedings, Vol.2, [1984], p.21-32, 6 refs.

The new anchor system consists of an inner steel rod with a base plate which is lowered into a drilled hole. The hole is partly filled with powdered snow on top of which a steel tube is placed with a diameter equal to the hole diameter. The steel tube is closed at the bottom. By pulling the inner rod against the tube the snow inside the hole is prestressed forming a stopper. The long time bearing capacity and the creep deformation of this anchor system is simulated in model tests. The one year behaviour of anchors of such type being installed near the Georg-von-Neumayer-Station in Antarctica is reported.

G-31245

Viramonte, J.G., Rivelli, F.R., **Exploitation of geothermal energy in Antarctica** [Hacia la explotación de la energía geotérmica en la Antártida], *Antártida,* Feb. 1984 No.13, p.10-13, 52, In Spanish.

A proposed study for the utilization of geothermal energy on Deception Island is outlined. Preliminary recommendations include the need for detection of thermal surface anomalies and the need for drillings to delimit the same, which will permit an evaluation of the geothermal potential of the area. It is suggested that a secure base be built and that such a plant, ant its complementary installations, be located in a hot area near a volcano in the southeastern portion of the island.

G-31248

Pierrou, E.J., **Argentine navy personnel saved the life of a British subject in 1958** [Personal de la Armada salvó la vida de un súbdito inglés en el año 1958], *Antártida,* Feb. 1984 No.13, p.28-29, In Spanish.

Attempts, ultimately successful, to provide medical emergency treatment from Brown Station to James Muirsmith, leader of Port Lockroy Base, who suffered from acute appendicitis, are described.

G-31335

Incoll, P., **AANBUS: the creation of a building system for Antarctica,** Canberra, Australia, Department of Housing and Construction, June 1980, var. p.

This paper provides an account of how the building system presently in use for constructing Australian buildings in Antarctica was developed and put into service. Notes on the climatic and logistic problems are included and a description of the buildings erected up to 1976 is provided for background to the account of the production of the current design. The "building system" is taken to include the form of the buildings themselves and the way they relate to each other and the site. The development of site planning and building design is therefore included in this paper. A full description of the elements of the building system as they were in mid 1980 is also provided. (Auth.)

G-31336

Taylor, P.T., Truong, H.V.P., **Evaluation of rock anchors for use in Antarctica,** Australia. Department of Housing and Construction. Central Investigation and Research Laboratory, Nov. 1980, c65 leaves.

The tests carried out in this investigation were concerned solely with anchors suitable for use in competent rock. Information on the nature of the near surface materials likely to be encountered at the three main Australian Antarctic bases of Mawson, Casey and Davies indicated that a competent rock could probably be reached in the majority of cases within reasonable depths. For the purposes of this investigation a minimum temperature of -15C was adopted as a realistic lower level. In addition some comment has been directed towards the practical aspects of employing the anchors in Antarctica and to the costs of the anchors. Interim reports on the progress of the evaluation programme were submitted in March, June, and Oct. 1980. The results in those reports have been included in this final report. (Auth. mod.)

G-31337

Taylor, P.T., **Evaluation of chemical concrete for antarctic ground anchors; interim report,** Oct. 1982, 7 leaves, Manuscript report.

Subsequent to field investigations laboratory tests were conducted on frozen cement grout and another product based on magnesium phosphate which was found to be able to cure at temperatures below zero. The Vertipatch, a magnesium phosphate based grout, is capable of curing at temperatures to -10C, which is below measured ground temperatures recorded during the summer months on the Antarctic bases. The indications are that it will not cure at -15C. The presence of salt water at an equivalent concentration to that found in ground at Davis does not appear to affect the cured properties of the grout as tested in model anchors. The strength of the Vertipatch, as measured by compression tests is, at about 28 MPa, considerably stronger than strengths obtained from frozen cement grout of about 5 MPa when cured at the same temperature of -5C. In laboratory tests on model anchors the frozen cement grout appeared to partially hydrate at -5C and gave variable results which were not typical of results obtained from field testing in Antarctica. (Auth.)

G-31338

Australia. Department of Housing and Construction. Antarctic Rebuilding Program, **Review of ground anchor tests and procedures,** Aug. 1984, 23 leaves, 8 refs.

This report provides a review and comment on the deep anchors used for holding down the buildings and other major structures under wind load. Anchor testing was carried out at selected Antarctic bases during the summer months of 1981/82, 82/83 and 83/84. These items are the current problem areas which require resolution. Anchor holes have become unstable during drilling at many of the locations where shallow depths of moraine overlie the rock. To ensure the integrity of the grout particularly in wet holes attempts were made to inject grout from the bottom of the anchor holes using a compressed air cylinder. Because of some practical on-site difficulties the cylinder has been discarded and all anchors are still grouted by top pouring of grout. Because of concern that Portland cement grout may not cure in the sub-zero ground temperatures an alternative grout, MPV, has been proposed. It has superior curing and strength properties to that of Portland cement but causes some problems with respect to workability and placement. This report reviews and makes recommendations on these three main problem areas and highlights other associated areas where further consideration or work is warranted. (Auth. mod.)

G-31339
Australia. Department of Housing and Construction. Antarctic Rebuilding Program, **Ground anchor design guidelines,** May 1984, 15 leaves.

Details are given for drilling anchor holes, explaining drilling rigs, drill bit sizes and types, local problems, and drill accessories. Anchor types, locations, minimum requirements, tolerances, and tests are described. Pedestal and grouting techniques are also described and varying structural design alternatives are discussed.

G-31340
Australia. Department of Housing and Construction. Antarctic Structural Group, **Design of the cladding system for use on antarctic projects,** Aug. 1984, 39p., Refs. passim.

Tests on polystyrene sandwich panels fixed to a supporting framework of double *C* section purlins and girts are described. Numerous sketches and computations are included, targeted mainly at safety considerations to provide strength in the buildings to withstand the antarctic climatic conditions. The primary concerns are the strong katabatic winds along the coast.

G-31341
Australia. Department of Housing and Construction, **Power house plant installation manual for prefabricated antarctic buildings and reticulated services,** Canberra, 1981, n.p., 2nd ed.

Assuming relevant skills are possessed by those engaged in installation work, the manual is a supplement to the detailed power plant drawings at the sites. For Mawson, Casey, and Davis it addresses alternator sets, boilers, exhaust flues, fuel supply, water supply, and electrical installations.

G-31342
Australia. Department of Housing and Construction, **Rebuilding Australia's antarctic stations. Statement of evidence to the Parliamentary Standing Committee on Public Works,** Canberra, Feb. 1981, 24p. + attachments.

The proposal is long-term, covering a ten year project for Mawson, Davis, and Casey. It covers most aspects of city planning: electricity, waste disposal, potable water supply, road and building layouts, environment concerns. Additionally, cargo handling areas, helipads, laboratories, messing, sleeping, and recreation facilities are included. Most of these are depicted in the accompanying drawings and plans.

G-31343
Australia. Department of Science and Technology, **Rebuilding Australia's antarctic stations. Supplementary statement of evidence to the Parliamentary Standing Committee on Public Works,** Canberra, Mar. 1981, 15p.

Emphasis is placed on the need for expanding the logistics program to include air transport from Australia to Antarctica, to either Casey or Mawson. The continuance of high quality of science programs at these stations and Davis with the possibility of establishing a fourth location strengthens Australia's antarctic territorial claims.

G-31355
Retamal, E., **Some aspects of antarctic engineering** [Algunos aspectos de la ingeniería antártica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.147-159, In Spanish. 3 refs.

The physical environment of Antarctica is described and its economic potential reviewed. Stations representing Chile and other nations are shown on a map and their histories given briefly. Engineering problems are discussed, with special reference to ice and snow characteristics. Tests of ice and snow resistance and deformation are described and the results are tabulated. Applications to airplane landing are indicated.

G-31356
Lopetegui Torres, J., **Antarctic infrastructure and policy of access to the continent** [Infraestructura antártica y política de acceso al continente], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.161-177, In Spanish. 2 refs.

The climatic and geological differences between the Antarctic Peninsula and the continent are briefly described, and the basic framework of stations, ports, runways—including ski-ways, snow-ways and the landing strips made with sea ice—that facilitate access to Antarctica are discussed. The history of antarctic air navigation is reviewed, as are current problems inherent to flying in Antarctica, such as intense cold, terrestrial magnetism, communications blockage, and abrupt climatic changes. Safety problems ensuing from the dispute for authority over antarctic skies among different nations are also considered.

G-31372
Australia. Department of Transport and Construction, **Casey domestic building, Vol.1. AANBUS erection manual for prefabricated antarctic buildings and reticulated services,** Canberra, 1982, var. p.

The manual explains the purpose of various materials and techniques, and suggests some appropriate erection procedures. Thus, when on-site decisions are being made, the intentions of the designers and the importance of some design features should be understood. The manual does not seek to be exhaustive in detailing erection procedures. It is intended to supplement the site construction drawings by outlining the general erection procedures and isolating particular areas where the drawings are over-complex for erection purposes.

G-31373
Australia. Department of Transport and Construction, **Casey site services, Vol.1. AANBUS erection manual for prefabricated antarctic buildings and reticulated services,** Canberra, 1982, var. p.

The manual gives specific details for the erection, installation, maintenance, and trouble shooting of equipment and structures at Casey Station. Step by step instructions for erection and tiedown of structures, bridges, towers, and cables are given along with arrangements for structural support members.

G-31374
Australia. Department of Transport and Construction, **Halon fire protection system for store buildings. AANBUS erection manual for prefabricated antarctic buildings and reticulated services,** Canberra, 1982, var. p.

This manual has been prepared to assist personnel installing Halon gas fire protection systems (H.F.P.S.) in store buildings at Australian Antarctic bases. The manual explains the purpose of various materials and techniques, describes installation procedures, and briefly explains the operation of the Halon system. Thus, the intentions of the designers and the importance of particular design features should be understood when on-site decisions are being made. The manual does not detail installation procedures exhaustively. It supplements working drawings by, first, outlining the overall installation sequence, second, isolating particular areas where correct procedures and proper completion of work are vital to the successful performance of the Halon system and, third, highlighting practices peculiar to Antarctic bases. (Auth.)

G-31375

Australia. Department of Transport and Construction, **Mawson bulk fuel system. AANBUS erection manual for prefabricated antarctic buildings and reticulated services,** Canberra, 1982, var. p.

The manual covers the transfer of fuel tanks from ship to shore, and the installation of fuel tanks, reticulation pipework, walkways, the pumping station and electrical installation. It concentrates on handling tanks between ship and final location ashore. It includes detailed descriptions of the recommended procedure for 'splitting' the tank pairs and reassembling as completed storage units. In other areas such as pipework, electrical and pumping station installation, the manual must be read in conjunction with specifications and drawings. (Auth.)

G-31376

Australia. Department of Housing and Construction, **AANBUS data sheets for erection of prefabricated antarctic buildings and services,** Canberra, 1984, var. p.

These data sheets provide detailed description of various tasks associated with building construction in Antarctica. They should be read in conjunction with the Erection Manual and Drawings for the specific building or construction being erected. To facilitate quality control during construction, certain tests are required to be done on site. Data sheets address the following specific topics: cold and wind —the basic design considerations, soil compaction, ground anchors, concrete (2 data sheets), grout epoxy and scaffold tubes, cladding, internal linings, mechanical services, insulation, heat shrinking, pipework, electrical services, and cable joining. (Auth. mod.)

G-31377

Banhidy, J., **Casey old station site plan, Issue No.2,** Canberra, Aug. 1984, 1 sheet.

The drawing of the station layout at a scale of about 2.5cm/50m shows locations of buildings and identifies them by function. Routes of reticulated services both above and below ground are also shown as are E-W and N-S construction lines and benchmarks. Prevailing wind is easterly at Casey; most structures are oriented parallel with it.

G-31381

Holmes, I.E.B., Cross, R., **Waste disposal at Australian antarctic stations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.308-315.

The redevelopment of Australia's antarctic stations provides an opportunity to upgrade waste disposal systems currently in use there. Some of the conceptual and technological improvements are explained and discussed. Attachment A gives a description of the filtration system and the functions of major components.

G-31438

Dater, H.M., **Dakotas in the Antarctic; a study in versatility,** Washington, D.C., U.S. Naval Support Force, Antarctica, 1971, 30p., Refs. p.26-30.

DLC TL686.D65U56

The history of the contribution made by Dakota aircraft to the development of the Antarctic is outlined, from their first flights to Antarctica during World War II, through their re-introduction to Antarctica during *Operation Deep Freeze II* in 1956, to the landing on the South Pole, and *Deep Freeze 68* a decade later. The technical difficulties in landing on ice and in bad weather, and missions accomplished by the various crews are told; specific dates, places and miles covered are given. Three appendixes give the aircraft specifications, a note on Argentine DC-3 operation, and a note on Soviet twin-engine LI-2, respectively.

G-31474

Maidl, B., Bruhl, H., **Ice plug anchor—development of a new anchor for use in snow and ice,** International Offshore Mechanics and Arctic Engineering Symposium, 4th, Dallas, Texas, Feb. 17-21, 1985. Proceedings, Vol.1, New York, American Society of Mechanical Engineers, 1985, p.442-450, 7 refs.

A research order enabled the Department of Construction Methods and Construction Management to develop a new anchor for snow and ice that shows greater resistance to extraction than commonly used screw or dead-man anchors. At Georg-von-Neumayer-Station, Antarctica, test programs had been undertaken in the years 1981 and 1983 investigating construction, technique of installation and load capacity. The results lead to a nomogram determining the permissible load or the time to failure of the ice plug anchor with regard to structural parameters. A comparison to screw and dead-man anchors established the feasibility of using ice plug anchors in polar snow. Ice plug anchors showed higher load capacity, less strain and a longer time to failure. This report shows test arrangement, realization and results.

G-31481

Salvia, J.C., **LRA 36: an Argentine voice born in Antarctica** [LRA 36: Una voz argentina que nació en la Antártida], *Antártida,* May 1982 No.12, p.34, In Spanish.

The preparation for, and installation of, the first Argentine radio station, inaugurated Oct. 20, 1979, on the base Esperanza, are described.

G-31484

Alaimo, S., **Geopolitics of transpolar flights** [Geopolítica de los vuelos transpolares], *Antártida,* May 1982 No.12, p.40-48, In Spanish.

Transpolar routes, the presence of Argentine Air Force in Antarctica, the importance of the airport facilities of Marambio base, and chronology of Argentine transantarctic flights—both cargo operations and passenger flights—are discussed. The distribution of airfields and the principal interbase routes in Antarctica are shown.

G-31487

Pierrou, E.J., **First direct flight Antarctica-Buenos Aires was made by the Argentine navy** [El primer vuelo directo Antártida-B. Aires lo efectuó un avión de la Armada], *Antártida,* May 1982 No.12, p.63-64, In Spanish.

The first Argentine direct flight between Deception Island and the city of Buenos Aires on Jan. 19, 1958, is described.

G-31494

Middleton, P., **Operation Ice Cube,** *Flight international,* Jan. 12, 1985 127(3942), p.22-25.

The title derives from the series of flights operated by the Royal New Zealand Air Force in support of antarctic scientific research programs. The author provides a vignette of a normal, nearly 7-hour flight from Christchurch to McMurdo aboard a C-130 Hercules in the company of scientists, sailors, aircrew, and cargo. Baggage, survival equipment, and cold weather clothing are briefly noted; ploys used by passengers to diminish the noise and ennui of a flight in a mainly-cargo configured aircraft are mentioned. Comments are made on polar air navigation systems, procedures and tools.

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G-31495
Middleton, P., **Antarctic shuttle,** *Flight international,* Jan. 12, 1985 127(3942), p.26-28.

The special geographic requirements, operational methods, and maintenance problems associated with the aircraft flown by Air Development Squadron Six (VEX6) in support of Operation Deep Freeze are examined. Of particular note are the ski-equipped C-130s and UH-1N helicopters. Advantages and disadvantages of the Hercules are discussed.

G-31513
Symposium on Antarctic Logistics, 3rd, Leningrad, 1982, **Proceedings,** Scientific Committee on Antarctic Research, [1983], 634p. in 3 vols., Refs. passim. For individual papers see: 36-2355, 36-2356, 37-2189, 37-2384, 39-1683, 39-2246, and 39-2591 through 39-2632, or 12G-25957, 12G-25958, 13G-26561, 13G-27716, 13G-27758, 14G-31175, 14G-31381, and 14G-31513 through 14G-31566.

The papers are published in an essentially unedited format and arranged in seven categories: publications, telecommunications, transport, buildings and services, energy, soil contamination, and field operations, equipment, and clothing. Most are full papers as presented, but some are abstracts or somewhat extended abstracts. Within the categories, they cover, among other topics: transmitter stations, automatic weather sensing stations, ice piers, air navigation, sledges, runway construction, sea ice variations, rebuilding antarctic stations, desalination systems, wind power utilization, oil pollution, medical services, a diving program, ice coring, and field equipment.

G-31514
Fowler, A.N., **Survey of United States literature on antarctic logistics,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.14-20.

This paper reviews the significant writings by Americans, during the modern era, on or related to Antarctic logistics. These are identified in two segments. First there are the 21 articles published in the records of the two earlier Symposia on Antarctic Logistics, in 1962 and 1968. A summary of the present status of the information in these 21 papers is given. The second segment is a collection of publications that have appeared since the time of the 1968 meeting. (Auth.)

G-31515
Foster, M.S., **Operational weather forecasting using weather satellite imagery in Antarctica,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.21-24.

The weather satellite imagery system is described, its capabilities and applications are enumerated, and its necessity in weather-data-sparse locations such as Antarctica is emphasized. Data gathered at McMurdo from polar orbiting weather satellites has enhanced the ability to provide accurate forecasts in support of the antarctic science programs.

G-31516
Carvajal, E.M., **Complementation and movement of the transmitter station in support of meteorology,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.30-38.

Upgrading of the Chilean meteorological telecommunications system on Ardley and King George Islands in the Shetland Islands is described. Selection and preparation of the site on the Fildes Peninsula, transporting the equipment, and providing electric power are discussed. Diagrams showing general locations, antenna configuration and microwave link, locations of generators and transmitters, hut supports, and transport methods are included.

G-31517
Araya F., M., Rojas, J.R., Vasquez P., P., **Deployment of satellite automatic weather sensing stations in the Antarctic Peninsula: logistic problems and solutions,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.39-68.

A review is given of the Chilean experience in the deployment and data collection activities of remote automatic weather sensing stations. With the advent of satellites, these deployed stations can be monitored by and their data transmitted to the polar orbiting NASA and NOAA spacecraft for retransmission to ground stations on the Antarctic Peninsula. Communications equipment used and its installation at the Chilean stations are described. Photographs and diagrams are included.

G-31518
Thomson, R.B., **Antarctic telecommunications: a brief history and the situation today,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.69-76.

Using the IGY as a start point, the status of meteorological communications to, from, and within Antarctica is reviewed. Most of the discussion centers on recommendations made by participants at Antarctic Treaty Consultative Meetings (10th, 11th, and 12th), goals established in the terms of reference for the Working Group on Logistics Telecommunications Sub-committee, and discussions of other international organizations. The consensus is that the system stands in need of substantial improvement and several ways/methods are suggested to enhance the flow of meteorological information.

G-31519
Holmes, I.E.B., **Review of Australian antarctic logistics field programs and equipment,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.78-85, 6 refs.

Inland field traverses are conducted from Mawson and Casey Stations to support Antarctic scientific field programs. Developments in traverse equipment since 1968 and experience gained with some equipment in field use over the past fifteen years are described. Tracked carriers have potential for offering greater flexibility when used in support of tractor trains; however, vehicles tested in the field so far have not given reliable service. (Auth.)

G-31520
Dubrovin, L.I., **Natural ice piers,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.86-88, 2 refs.

Dimensional and other characteristics of suitable unloading piers are given and various kinds of natural antarctic piers are discussed: floating ice, shelf ice, rocky cliffs, persistent snowbanks. Factors which should be considered when contemplating the use of the available types are pointed out. Shoreline changes, retreat of ice edges, water temperature, thermal abrasion of ice shores, tidal, wave, and swell effects are among these significant natural processes which must be recognized.

G-31521

Romanov, A.A., **Scientific/operational support to the Soviet Antarctic Expedition studies,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.89-93.

The Antarctic Meteorological Center (AMC) at Molodezhnaya has substantial responsibilities for gathering environmental data and preparing forecasts of these natural phenomena. Severe weather in high latitudes, the sea ice, and stormy seas all present hazardous or extremely hazardous conditions for man so that advance warning of these conditions is a necessity for survival. The equipment, capabilities, procedures, and schedules of the AMC to meet its responsibilities are described. The use of computers and satellite imagery has improved the timeliness and accuracy of the products of the Center for use by field scientists, research and logistics vessels, aircraft operations, and traverses.

G-31522

Kozlovskiĭ, A.M., **Marine transport operations of the Soviet Antarctic Expeditions (SAE) in 1971-1981,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.94-98.

A brief review is given of the vessels which participated in the SAE during the period. Sizes, types, cargo and passenger capacities, speeds, ranges, bunker capacities, and displacements are given for the *Ob', Michael Somov, Professor Vise,* and *Elbrus.* Their methods of operation are described as they remanned and resupplied the Russian antarctic stations: Molodezhnaya, Mirny, Russkaya, Novolazarevskaya, Bellingshausen, and Leningradskaya.

G-31523

Aver'ianov, V.G., Klokov, V.D., Alekhin, A.N., **Air navigation support for scheduled flights of IL-18 aeroplanes to Molodezhnaya Station,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.99-105.

A detailed description is given of the construction of the snow runway at Molodezhnaya Station in 1980. During the pre-construction phase three major technical problems had to be resolved: understanding of the mass-energy exchange on the ice and in the snow-firn; increasing the bearing capacity of the snow; development of working techniques for the construction phase. When these had been resolved a runway suitable for IL-18 operations into the station was realized.

G-31524

Kohnen, H., **Ground transportation at the antarctic stations of the F.R.G.,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.106-114.

Emphasis is centered on two types of snow cutter and a snow mobile which are specially designed for scientific support and logistical tasks at antarctic stations. Details of size, operation, and capabilities of these vehicles are given.

G-31525

Bungenstock, H., Hempel, G., **RV *Polarstern:* Polar research and supply vessel of the F.R.G.,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.115-118.

Details are given of the need by the GDR for an antarctic research vessel and the processes through which the ship came to be built, launched, and put into service. Cargo and personnel capacities are shown; on board research equipment is noted; ice navigation capability is stated; and the provisional schedule and vessel costs are given.

G-31526

Kusunoki, K., **Japanese icebreaker *Shirase*,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.119-126.

In April 1979 the Japanese Government decided to build a new icebreaker (Arctic Class 4) to replace the icebreaker *Fuji* which was built in 1965. The new ship *Shirase* will carry personnel, cargo, helicopters, and provide for onboard observations. The standard displacement is 11,000 tons, and the propulsion capacity of 30,000 SHP is provided by six sets of generators and motors which drive three propellers through three shafts. Accommodation for 60 scientists plus 170 crew and capacity for a cargo of 1,000 tons are provided. Laboratories for the onboard research of upper atmosphere physics, oceanography, biology, geosciences and gravimetry and a data processing room are also provided. She will be commissioned in the 1983/84 season. (Auth.)

G-31527

Moriwaki, K., Kusunoki, K., **Use of small air-cushion-vehicle (MV-PPO5A) at Syowa Station,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.127-128.

Design details of the vehicle are listed and its record of performance from Dec. 1981 to Feb. 1982 is given. The cold weather performance of the vehicle is given for tests on flat sea ice, obstacle crossing, low temperature, and suitability for use over rugged surfaces.

G-31528

Nel, J.G., **SANAE off road equipment vehicle,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.129-130.

Pertinent details of a tracked vehicle construction are given and the SANAE driving experience with it in Antarctica is reported.

G-31529

Nel, J.G., **Vehicles used by the S.A.N.A.E.,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.132-136.

At SANAE Station the vehicles used are classed as light, medium, or hauling transport. Specific vehicles in each category are identified, described, and their performances assessed.

G-31530

Leith, B., **MV *S.A. Agulhas*,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.137-139.

The ship is described as to size, crew complement, passenger and cargo capacities, science laboratories, accommodations and facilities, helicopter operations, navigation equipment, radio communications, and polar operations capabilities.

G-31531

Dean, R.A., **Helicopter operations S.A.N.A.E.,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.140-141.

Helicopter operations for SANAE date from Dec/Jan 1980/81. 2 Puma SA330 civilian class helicopters are in use, flying from *SA Agulhas* to SANAE Station. The author strongly warns of the sudden onset of hazardous weather typical of the Antarctic and emphasizes the measures taken to ensure the integrity of flying safety.

G-31532

Carvajal, E.M., **C130 and DHC5 air drops in Antarctica,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.142-143.

Air operations in support of the Chilean station on the eastern side of Adelaide Island just south of the Antarctic Circle are briefly described. Types of aircraft involved and the materiel transported are noted and details of air drop procedures are included.

G-31533

Carvajal, E.M., **Runway at Rodolfo Marsh Martin Station,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.144-155.

Details are given of the site selection and construction of the airfield on Fildes Peninsula on King George Island. The complex is composed of the runway, hangar, and the air terminal and guest house. The runway, oriented ESE-WNW (110-290), is 1,305 m long with expansion capability to 1,600 m if necessary. Radio navigational aids include radio beacon, VOR/DME, and radio beacon finder. Diagrams are included of the air approach patterns using these aids. Sketches are also included of the other airfield facilities.

G-31534

Alarcon, B., Marangunic, C., Villanueva, V., **Preliminary studies for the project of a landing strip at Capitan Arturo Prat Base, Greenwich Island,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.156-194, 6 refs.

This paper shows the preliminary work and geotechnical studies for the design and development of an airstrip in support of Chilean antarctic research. Geotechnical studies show a favorable terrain formed by terraces and littoral berms, with a minor proportion of intermediate to basaltic andesite rocks. Complementary analysis of photointerpretation was made on aerial photographs obtained in February 1980. By conventional aerophotogrammetric methods, the necessary information was obtained for the design of the runway. The scale 1:4,000 allowed conforming to technical specifications for airport Code C-D, according to norms Annex 14 OACI. In the field an axis of 1,230 m was staked off with sufficient room for lengthening to 1,430 m. Complementary studies of the mechanics of ice resistance for skiways were also made. (Auth. mod.)

G-31536

Clark, N., **Motorized toboggans,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.200-205.

The New Zealand experience with this type vehicle is described and an evaluation of the types used is given. During the period from 1969-1974 the three toboggan types used were: Sno-tric (Sweden); OMC Snow Cruiser B (Canada); and Rupp 440 Snowmobile (US). These are compared and performance assessments are given.

G-31537

Clark, N., **Movement of resupply cargo to Scott Base by container,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.206-207.

The shift by New Zealand to container shipment of cargo for antarctic resupply has produced outstanding results in reducing shipping and handling costs, in nearly eliminating damaged goods, increasing security of the materiel, and in presenting incoming wintering parties with goods ready for use, in the order to be used.

G-31538

Clark, N., **Sledges,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.208-209.

In a program to collect sediment samples from the floor of McMurdo Sound, New Zealand teams were often halted or delayed by intimidating weather. Since the operation involved setting up a drilling rig over a hole in the ice, it was suggested that a Wanigan mounted on a sled would let operators work protected from the wind and cold. A steel sledge with skis was built and used. Logistical difficulties are mentioned.

G-31539

Gosbell, K.B., Holmes, I.E.B., **Rebuilding of Australia's 3 antarctic stations, Parts 1-3,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.214-273.

A rebuilding program to redevelop the Mawson, Davis and Casey stations is presented in three parts. Basic requirements are outlined, and the underlying concepts behind the master planning of each station are described, in part one. The building system is covered in part two, and the engineering services in part three. Details of the new construction are given along with the rationale for building placement on the sites taking into consideration prevailing wind direction, snow drifting, protection of personnel and buildings against 100+k winds. Differences in construction between the stations are pointed out. Problem areas in the earlier construction are rectified in the plans for the new buildings. Comparisons between the old and the new are facilitated by the photographs included.

G-31540

Holmes, I.E.B., **Support of construction activities during rebuilding of Australia's antarctic stations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.274-279, 2 refs.

Australia's three Antarctic stations are being redeveloped to provide more permanent accommodation. The new buildings and associated facilities require provision of plant and equipment and temporary accommodation and services to facilitate on-site construction work. Equipment has been selected to enable all activities to be completed as scheduled. (Auth.)

G-31541

McEwan, R., Gosbell, K., **Concreting practices at Australian antarctic stations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.280-287, 4 refs.

This paper describes the successful techniques now being used to ensure the production of sound concrete structures in Antarctica. (Auth.)

G-31542

Holmes, I.E.B., **Modular ISO sea container caravan for antarctic use,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.303-307, 1 ref.

Modified ISO 20 tonne sea containers have been used as a basic module for traverse caravans. The containers have been fitted out as either living vans or powerhouse/workshop vans, and mounted on Otaco 10 tonne Powerhaul sledges. The modules provide flexible accommodation units for other uses including field camps and temporary station accommodation. (Auth.)

G-31543

Smith, A., **New design concept for Halley Station,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.316-325.

The original buildings at Halley Station, and those built subsequently and progressively buried and crushed by accumulating snow, are described. A new design concept, born from the experience gained, is presented, consisting of four interconnecting cylinders offering two-storey accommodation for 18 individuals and with a life expectancy of 15 years. The systems providing such services as power generation, heating, ventilation, toilet facilities and fire detection, are described.

G-31544

Korotkevich, E.S., Efremenko, V.N., Shirshov, V.E., **Construction and reconstruction of scientific stations in the Antarctic,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.326-337.

The original buildings at USSR stations in Antarctica, and the shortcomings of those built subsequently, are described. The construction problems were solved when the utilization of modular houses was initiated. The elements and procedures involved in such construction are described in detail, and the buildings are illustrated. Descriptions of units at Molodezhnaya Station, and other permanent and temporary Soviet constructions in Antarctica, are provided.

G-31545

Mannhardt, S., **Technical concepts of the antarctic stations Georg-Von-Neumayer and Filchner of the Federal Republic of Germany,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.338-347.

The design of the Georg-Von-Neumayer Station provided for container-type buildings, which are protected against direct climatic effects by tubes consisting of corrugated steel sheets. The two tubes, of which the station consists, are described and the layout is illustrated. Described are also the systems providing such services as power and energy, heating, ventilation, water supply and refuse disposal. The communication equipment is listed, as are safety concepts and installations. At the Filchner Station, seven 20-foot Isonorm containers have been built on a steel structure, consisting of a 25-ton grid pillared platform, as living and research facilities for 15 persons, as were two 10-foot containers for energy supply and snow melting plant.

G-31546

Hannuki, T., Kusunoki, K., **Floor-elevated summer quarters at Syowa Station,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.348-353.

The design and construction of a floor-elevated two-story building, as summer sleeping quarters at Showa Station, are described. To control snow deposition, the building was constructed on reinforced concrete pillars, with prefabricated wooden panels supported by steel skeletons. The prefabricated elements were made in Japan from July 1978 to March 1979. Since the building materials were to be transported by helicopter, their maximum length was less than 5 m, which corresponds to the size of the fuselage. (Auth. mod.)

G-31547

Gernandt, H., Tripphahn, B., **Laboratory base for geophysical observations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.354-358.

The construction material and procedure for a German laboratory base at Schirmacher Ponds, consisting of 20-foot transport containers, covering an area of 120 sq m, and offering housing for six persons, are described. The advantages of the container system are summarized, showing the containers to be easy to unload, transport over snow and ice, assemble and expand. The scientific programs carried out at the laboratory base, and its expansion, are discussed.

G-31548

Santiago de Chile. Instituto Antártico Chileno, **Reverse osmosis desalination system for use on small ships, refuges and boats,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.359-366.

The system and equipment used to replenish the water supply of the M/S *Capitan Alcazar,* chartered by INACH for the 1981-1982 Antarctic Expedition, are described. The unit had a capacity of 1,000 gallons/day. The possibility of using smaller units in antarctic refuges, and portable units in boats, is considered.

G-31549

Araya F., M., Vasquez P., P., Rojas, J.R., **Main considerations about the future use of more practical, safe and comfortable Chilean antarctic bases and refuges,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.366-381, 4 refs.

Current and future problems related to fire prevention, sanitation, water supply, energy conservation, and accomodations on Chilean bases and refuges in the Antarctic are identified, and solutions are offered. The most advanced project discussed related to the use of portable refuges made of reinforced plastic.

G-31550

Varcoe, G., **Fire equipment—sprinkler system,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.382-384.

Fire continues to represent a major hazard to those living and working in Antarctica. Within the design concept of the new Scott Base building program, provision has been made for the installation of a series of compact, self contained, sprinkler units to each individual building within the complex. This paper describes the innovative, but effective sprinkler system. (Auth.)

G-31551

Varcoe, G., **Reverse osmosis hyperfiltration water plant installation, Scott Base,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.390-398.

In order to considerably reduce and possibly eliminate the use of an ice melter for providing the base with fresh water, a reverse osmosis hyperfiltration water plant, model DDS RO HF30 with a capacity of 8,000 liters per hour was installed in the new powerhouse during the 1978/79 season. The RO plant was manufactured by De Danske Sukkerfabrikker of Denmark. Subsequent failure to operate to specification has persuaded the manufacturer to replace the original plant and the modified version is scheduled for installation during the 1982/83 season. This paper documents the problems experienced with the initial plant. (Auth.)

G-31552

Varcoe, G., **Scott Base rebuilding programme,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.399-405.

Due to recognition of the need to replace the original buildings with a larger, more modern complex, embodying new technologies and facilities necessary to the efficient running of a continuously manned station, reconstruction of Scott Base was commenced in 1976 and is scheduled for completion in the mid 1980s. The new base will provide a living and work area of 2,018 sq. meters, which is approximately three times the size of the original base. Against a background of valuable experience gained from operating and maintaining the original base over a period of twenty years, this paper describes the staged development of the new base rebuilding program. (Auth. mod.)

G-31553

Efremenko, V.N., **Energy supply for the Soviet antarctic stations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.469-472.

Technical characteristics of diesel-electric sets installed at diesel-electric plants at Soviet antarctic stations, and the loads of different capacity for which they supply electric power, are discussed and tabulated. The old 12 and 24 kW diesel generators are replaced by 45 kW generators, increasing the electric capacity of generators of Mirnyy and Molodezhnaya from 200 kW to 320 kW. At all stations, sets and electrical equipment are housed in special buildings, which are described.

G-31554

Ishizawa, K., Kusunoki, K., **Utilization of wind power for the Japanese automated stations,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.473-477.

An unmanned station for geomagnetic and meteorological observations, installed between Showa and Mizuho stations in January 1977, with an energy source from batteries charged by a wind generator, is described. The same principle was used to build two unmanned weather stations in a katabatic wind area, about 100 km southeast of Mizuho Station and 120 km southeast of Showa Station. The former was evacuated in 1981; the latter is still operating. Several malfunctions in the wind generator and battery charging system are described.

G-31555

Araya F., M., Radrigan A., R., Brante M., G., Weber U., I., **Use of wind and solar energy as a power supply for satellite automatic weather sensing stations in Antarctica,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.478-513, 7 refs.

A Chilean Remote Sensing Program developed in the Antarctic Peninsula, which has deployed an experimental net of automatic meteorological stations that send their environmental data via Landsat and GOES satellites to Santiago, is described. The main problems detected on antarctic data collection platform operations are listed, and the design of a power supply system to ensure reliable and continuous operation at any antarctic latitude, which includes solar panels, battery charger and protection circuits, wind generator, batteries, beacon device, data collection platforms and sensors, and a central energy controller, is discussed and illustrated. It is concluded that solar and wind energy can keep the automatic stations supplied at all times.

G-31556

Varcoe, G., **Power generation using natural sources,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.514-516.

This paper provides a resume of experience over the past fourteen years in the operation and maintenance of wind power generation plant, and more recently the introduction of solar cell power supply as an alternative to diesel powered generators, for small manual stations, radio repeaters and automatic stations in Antarctica. (Auth.)

G-31558

Monteath, C., **Notes on field equipment used by the New Zealand Antarctic Research Programme,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.552-556.

The modification and improvement of Nansen wooden dog sledge is discussed in the light of a preference for this vehicle over metal or fiberglass motor toboggan sledges. A description of Maudheim and Tamworth cargo sledges, polar tents, auxiliary tents, and field food ration boxes, with a list of their contents, is also provided.

G-31559

Chinn, E.J., **Development of mobile field units by British Antarctic Survey,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.557-572.

This paper describes the equipment, facilities and procedures used by the British Antarctic Survey, to help improve the efficiency of men undertaking scientific programs in the field. It covers skiddos, sledges, tents, rations, clothing, sleeping bags, field communications, and field medical equipment. Three annexes are included, one itemizing sledge ration boxes for 20 man/day as per 1982 specification, the eecond giving details of the field clothing described as worn from the body outwards, and the third providing specifications of down/fibre pile sleeping bags.

G-31563

Vrana, A., **Australian diving program in Antarctica,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.597-600.

Sample collection and survey of benthic biota, both on the ocean floor and the underside of surface ice, was carried out during the summer of 1982-1983 using SCUBA techniques between the coastline around Vestfold Hills and offshore islands. Safety procedures used during the diving operations are described, as well as the equipment used and the tests under way aimed at the improvement of cold weather performance of same. A research program conducted by the medical section into hypothermia and cold weather adaptation in man is also reported.

G-31564

Varcoe, G., **Operation of the Winkie core drill in Antarctica,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.608-611.

The operation of a compact, portable drilling unit in the Dry Valleys region of Antarctica is described. Drilling has been successfully accomplished to a depth of 50 m through loosely structured glacial sediments, providing continuous core samples, 30.162 mm in diameter. (Auth.)

G-31565

Monteath, C., **New Zealand's approach to survival training in New Zealand and Antarctica and New Zealand's Antarctic Research Programme search and rescue capability in the Ross Dependency,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.617-625.

A compulsory NZARP training course, whose structure spans a mixture of practical and theoretical sessions in science lectures, films, logistics planning, first aid, motor toboggan and sledge maintenance, radio procedure, fire fighting and aircraft safety is described. The aim of the course is to provide novices with a clear understanding of their jobs in Antarctica and an awareness of the dangers of polar environment and of the equipment and clothing used to combat some of the hazards. The contents of the NZARP search and rescue kit are listed.

G-31566

Monteath, C., **New Zealand antarctic field clothing. An update,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.626-634.

Description and quantity required of undergarments, footwear, outer garments, gloves, and sleeping bags, incorporated into the standard NZARP issue for field clothing, are presented.

G-31578

Jezek, K.C., **Radar measurements of borehole geometry on the Greenland and Antarctic ice sheets,** *Geophysics,* MP 1860, Feb. 1985 50(2), p.242-251, 12 refs.

A method for measuring the geometry of boreholes in glaciers has been developed and tested in Greenland and Antarctica. Coordinates of points along the borehole are determined by lowering a passive radar target into the borehole and then tracking the target from three surface stations. Comparison of geometry interpreted from radar data and from a conventional inclinometry experiment indicates that radar data can be used to estimate average borehole inclination and azimuth but cannot be used to measure details of the borehole geometry that are revealed by conventional inclinometry surveys. Random error introduced by variations in the physical properties of the glacier and electrical noise in the radar unit limit measurement accuracy, but the accuracy can be improved by establishing additional surface radar stations around the borehole. These experiments demonstrate the utility of the radar method and suggest the possibility of deploying permanently installed radar targets in ice sheets to measure intraglacial movements. (Auth.)

G-31708

Barthelemy, J.L., **Review of technology and construction problems for surface flooded ice runway on deep snowfield,** *U.S. Naval Construction Battalion Center, Port Hueneme, Calif. Civil Engineering Laboratory. Technical memorandum,* Aug. 1978 TM-61-78-11, 35p., 29 refs.

A major as-yet-unrealized (in 1978) goal of the U.S. operation at McMurdo Station is the construction of an ice runway on deep snow. The runway would be usable in all seasons and would accommodate large, wheeled, jet aircraft. The report summarizes and brings together relevant ideas and background information and suggests potential problems and possible solutions in the construction of such a runway through a process of surface flooding.

G-31729

Schmid, R., **Antarctic exploration by airplane** [Antarktis-Forschung mit Flugzeugen], *Naturwissenschaftliche Rundschau,* Mar. 1985 38(3), p.102-104, In German.

A brief review is given of the history of antarctic exploration and research and of German use of aircraft in the low temperatures and high winds of Antarctica. A renewed German interest in Antarctica in the 1980s manifested itself in the establishment of a year round station (Georg von Neumayer) and a major summer station on the Filchner Ice Shelf. The stations are supported by two aircraft: the smaller designed for logistics use as personnel and equipment transport to and from summer field camps. The larger craft is equipped and instrumented for aerial research projects. Both planes have the capability for long range flights between Bremerhaven and Antarctica.

See also:
A-29404 A-29827 A-30060 A-30331 A-30623 A-30624
A-30960 A-31399 B-29287 B-30686 B-31194 C-30622 C-31378
C-31379 C-31380 D-29291 D-29469 D-30810 D-30993
D-31154 E-29163 E-31070 E-31170 F-29043 F-29131 F-29169
F-29475 F-30487 F-30577 F-30863 F-30991 F-30992 F-31155
F-31175 F-31229 F-31496 F-31608 H-29322 I-29003 I-29040
I-30548 I-31100 J-29666 K-31326 L-30914 L-31048 M-31026

H. MEDICAL SCIENCES

H-28981

Deriapa, N.R., D'iachkov, V.A., Moshkin, M.P., Posnyĭ, V.S., Panin, L.E., **Comparative characteristics of seasonal rhythms of physiological functions under arctic and antarctic conditions** [Sravnitel'naia kharakteristika sezonnykh ritmov fiziologicheskikh funktsiĭ v usloviiakh Arktiki i Antarktidy], *Antarktika; doklady komissii,* 1982 No.21, p.175-188, In Russian. 39 refs.

A comparative study of seasonal rhythms of physiological functions substantiated the possible existence of an endogenic rhythm in man. The seasonal dynamics of some parameters of the endocrine system, and of the carbohydrate and lipid metabolism, are significantly different at the northern and southern poles. The influence of the duration of light on the seasonal dynamics of cold metabolism is determined, and the role of seasonal rhythms in man's acclimatization to Antarctica is discussed.

H-29140

Castrelos, O.D., Ikonicoff, S., Zunino, C.H., Margni, R.A., **Human immune humoral response in Antarctica** [Algunas consideraciones sobre la respuesta inmune humoral humana en el Continente Antártico], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.274, 26p., In Spanish with English, French and German summaries. 14 refs.

The study found a depression of human immune humoral response tested with two antigens, one particulate and the other soluble, as a consequence of the environmental conditions in Antarctica: the bioisolation and the cold. This diminution fully manifests itself as a function of the duration of the stay, and not by a diminution of the protein synthesis. (Auth.)

H-29144

Bianchi, R.A., Piezzi, R.S., Bernaldez, J., **Metabolic variations of 5-Hydroxindolacetic acid (5-HIAA) and vanillin mandelic acid (VMA) in the stable population of Belgrano Station** [Variaciones metabólicas del ácido 5-hidroxindolacetico (5-HIAA) y vainillin mandelico (VMA), en la población estable de la Base Gral. Belgrano], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.283, 11p., In Spanish with English, French and German summaries. 21 refs.

Isolation effects on urinary elimination of 5-HIAA and VMA were studies in 22 individuals from Belgrano Station during 1978. Significantly increased excretion of the total 5-Hydroxindoles during the four sampling periods (February, May, August, December) was found. Significant changes in the VMA excretion were not observed. These results are discussed in relation to some of the symptoms of the antarctic syndrome, specially sleep disturbances. (Auth.)

H-29188

Evdokimov, V.V., Petrosov, V.V., Skvortsov, V.T., **Level of normal antibodies and immunoglobulins in human serum under extreme conditions in Antarctica** [Uroven' normal'nykh antitel i immunoglobulinov v syvorotke cheloveka v ekstremal'nykh usloviiakh Antarktidy], *Zhurnal mikrobiologii, epidemiologii i immunobiologii,* Apr. 1983 No.4, p.106-109, In Russian with English summary. 15 refs.

The sera of 27 polar explorers wintering at the Vostok Station were studied. The dynamics of normal antibodies, correlating with the immunoglobulin level in the sera, were observed. The observation revealed that the development of changes in the content of immunoglobulins of different classes started at different times. The authors suggest that a common mechanism is responsible for the synthesis of nonspecific immunoglobulins and normal antibodies, the latter indicating the level of natural resistance to the action of various environmental factors. (Auth.)

H-29240

Panin, L.E., **Some theoretical and application problems in human adaptation to high latitudes** [Nekotorye teoreticheskie i prikladnye voprosy adaptatsii cheloveka v vysokikh shirotakh], Problemy ekologii poliarnykh oblasteĭ (Problems of ecology in polar regions) edited by G.V. Voropaev, Moscow, Nauka, 1983, p.45-59, In Russian. 9 refs.

Changes in chemical composition of human blood under high latitude conditions were studied in Antarctica, the Arctic and different climatic-geographic regions of Siberia. Media optimizing the variations of physiologic processes are discussed and the behavior of certain substances in blood of the Antarctic and Arctic inhabitants compared. Suggestions are made concerning the hygienic requirements and dietetic needs of people residing under extreme climatic conditions of the regions described.

H-29250

Parkinson, A.J., Muchmore, H.G., Scott, E.N., Scott, L.V., **Survival of human parainfluenza viruses in the South Polar environment,** *Applied and environmental microbiology,* Oct. 1983 46(4), p.901-905, 15 refs.

The survival of human parainfluenza virus types 1, 2, and 3 was measured in both indoor and outdoor environments at South Pole Station, Antarctica, in an effort to determine the long-term survival of these viruses in this environment and to identify the possible source of respiratory tract illnesses which occurred in this population in 1978 after 10 and 27 weeks of total social isolation. Viruses were applied to plastic petri plate surfaces which were then stored in indoor and outdoor environments. Parainfluenza virus type 1 was inactivated after 4 days at room temperature and after 7 days outside. Parainfluenza virus type 2 and 3 were inactivated after 7 and 12 days, respectively, at room temperature and after 17 days of storage outside. Results indicate that the long-term survival of parainfluenza virus in either environment for up to 10 weeks is unlikely and probably did not provide the source of infectious virus responsible for the mid-isolation outbreaks of parainfluenza virus-related respiratory tract illnesses observed in this population during the 1978 winter season. (Auth.)

H-29322

Norris, J., **"Scurvy disposition": heavy exertion as an exacerbating influence on scurvy in modern times,** *Bulletin of the history of medicine,* Fall 1983 57(3), p.325-338, 42 refs.

Ascorbic acid metabolism in man, and diagnosis, pathology, etiology and treatment of scurvy are discussed in connection with the high incidence of the disease in polar expeditions—such as Scott's Expeditions to the Antarctic, for example—and in seamen exposed to cold and hard life and stress of travel. Distances, days, loads and scurvy occurrence of four antarctic expeditions are tabulated, as are estimates of vitamin C content in base rations and sledge rations of various polar expeditions.

H-29485

Varela de Rodríguez, J.E., **Appraisal of the hypophysis function under cold stress conditions** [Valoración de la función hipofisaria frente al stress de frio], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.304, 9+12p., In Spanish and English. 13 refs.

The influence of exposure to antarctic conditions on a group of three men at Brown Station was studied. In basal samples (BS), and samples obtained under cold stress, prolactin (Pr), luteinizing hormone (LH), follicle-stimulating hormone (FSH), thyrotrophic hormone (TSH), somatotrophic hormone (STH), thyroxine (T4), triiodotironine (T3) and cortisol were determined in plasma. Electrocardiograms and body temperatures were registered. An alteration in diurnal rhythms of Pr and cortisol, as well as accelerated heartbeat were found, and some subjects showed low axilary temperatures under stress conditions. BS values were similar to those found in Buenos Aires, except for LH data, which were lower. It is concluded that the degree of stress in this group was sufficient to alter circadian Pr and cortisol rhythms but that the stress was not sufficient to increase hormonal values in plasma above normal. (Auth.)

H-29660

Matusov, A.L., Riabinin, I.F., **Basic results of studies on human adaptation to antarctic conditions** [Osnovnye itogi izucheniia adaptatsii cheloveka v usloviiakh Antarktidy], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.158-169, In Russian. 21 refs.

Results of medical observations carried out in Antarctica by physicians participating in expeditions over a period of 25 years are reported. Psychological and physiological effects of extreme cold and isolation on man, and his adaptation mechanisms, are described.

H-29933

International Symposium on Circumpolar Health, 6th, Anchorage, Alaska, May 13-14, 1984, **Arctic Environment —man and the future. Abstracts,** 1984, 271p.

The sessions of the International Symposium on Circumpolar Health, held in Anchorage, Alaska, in May 1984, are covered by approximately 250 abstracts. Nine of these report studies on physical fitness and training programs on an antarctic base, physiological parameters at British Antarctic Survey bases, a cooling power index based on human heat exchange, adaptation of pineal function to the antarctic environment, acclimatization to cold, a physiological survey of a wintering group—using the MIPG model, accidents in French antarctic and subantarctic wintering expeditions, medical recruitment for the Australian Antarctic Research Expeditions (ANARE), and some comparisons about perception in extreme environments, respectively.

H-30173

Panagis, K., Apps, P., Knight, M.H., **Seal finger: occurrence in Antarctica,** *South African journal of antarctic research,* 1982 Vol.12, p.49, With Afrikaans summary. 7 refs.

Two cases of seal finger "spekkfinger" contracted in Antarctica, by members of a team working with specimens from Ross seals, are described. The successful treatment of the disease and recommendations for the prevention of seal finger are given. (Auth.)

H-30210

Biziuk, A.P., **Eysenck's analysis at antarctic stations** [Issledovaniia po metodike Aĭzenka na antarkticheskikh stantsiiakh], *Problemy Arktiki i Antarktiki; sbornik stateĭ,* 1984 Vol.58, p.115-118, In Russian. 10 refs.

Several hundred men wintering at Soviet antarctic stations were studied for psychological adaptation to polar regions by Eysenck's method, which is based on two fundamental personality traits: extroversion-introversion and degree of neuroticism. Results at the end of winter showed a remarkable functional deterioration in emotionally unstable personalities, while in well balanced individuals the capability to adapt had increased.

H-30374

Gormly, P., **ANARE first aid manual,** Kingston, Tasmania, Department of Science and Technology, Antarctic Division, 1984, 58p., 3rd edition.

The manual is a management tool for treatment of medical problems and emergencies under field conditions in Antarctica. Basic medical principles are explained; resuscitation procedures and situations are demonstrated by text and sketches. Treatment of broken bones, sprains and dislocations, head injuries, wounds, burns, and snow blindness are among the first aid conditions discussed. Expeditioners are urged to study the manual and to carry it with them when leaving base on field trips.

H-30435

Tereliak, IA., **Physiological effects of prolonged social isolation** [Nekotorye psikhologicheskie posledstviia prodolzhitel'noĭ izoliatsii], *Kosmicheskaia biologiia i aviakosmicheskaia meditsina,* Mar.-April 1984 18(2), p.54-56, In Russian. 10 refs.

The process of socio-emotional adaptation of a small group wintering in Antarctica is analyzed, and the symptoms of the wintering syndrome are listed as depression, irritability, hostility, insomnia, loss of interest in work, decrease of intellectual capabilities, and listlessness. The psychological tests, conducted on 20 men of average age 34 y. at Arctowski Station, are found to be applicable to space medicine as well.

H-30584

Taylor, A.J.W., **International Biomedical Expedition to the Antarctic (IBEA),** *New Zealand antarctic record,* 1984 6(1), p.36-45, 4 refs.

This presents the research programme of a unique interdisciplinary and international group of scientists whose purpose was to study human performance and adaption to a naturally stressful environment. It sets out the logistics adopted for the particular research, outlines the scientific programme, details the psychological components of the study, describes the numerous physiological, psychophysiological and clinical investigations that were employed before/during/and after exposure to the Antarctic climate, and finally sketches the outcome in which the psychological parameters were considered far more revealing than any others. (Auth.)

H-30651

Deriapa, N.P., Matusov, A.L., Tikhomirov, I.I., **Adaptation and health of man in Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.303-318, TT 79-52012, For Russian original see 10H-21707. 22 refs.

An overview and the major findings of research by soviet physicians in Antarctica over the past 20 years is given. The history of the development and organization of medical research at soviet antarctic stations is reviewed; in the early years medical work was not part of the research program. Results are reported in the following categories: mental health problems during adaptation; physiology and clinical features of acclimatization: morbidity of polar workers; and health care delivery to polar expeditions. The most promising areas for further study are mentioned. (Auth. mod.)

H-30652

Tashpulatov, R.IU., Guseva, E.V., Evdokimov, V.V., Petrosov, V.V., **State of human immunity under the severe conditions of Antarctica,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.319-344, TT 79-52012, For Russian original see 10H-21708. 24 refs.

Published results and the author's own findings on the immune response in animals in Antarctica and on changes in immunity in humans are reviewed. Under extreme antarctic conditions, i.e., nearly complete absence of microbes at stations far inland, cell and body immunity in man undergoes sharp variations, which may account for the outbreak of endogenous infections. (Auth. mod.)

H-30694

Muchmore, H.G., Parkinson, A.J., Scott, E.N., **Respiratory virus infections during the winter at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.229-230, 8 refs.

The problem of common colds occurring at South Pole Station during the middle of the isolation period, long after the accepted incubation period for human common cold viruses and when the introduction of new virus to the community was impossible, is addressed. During the 1974 and 1975 winters throat swabs were collected from subjects, but no virus was isolated. Again during winter 1976 no virus was grown, but the results suggest that parainfluenzaviruses were responsible for the mid-isolation colds. Parainfluenzaviruses 1 and 3 were also recovered from the mid isolation community during 1978. None were detectable in 1977 wintering subjects. During the 1981 winter a rhinovirus was obtained from a symptomatic subject and in 1982 colds were accompanied by nonbacterial gastroenteritis. The presence of these viruses in the South Pole Station community after more than 10 weeks of total isolation suggests their long-term persistence either in the environment or in one or more subjects. The results also suggest that more than one virus may be involved in the etiology of mid-winter common-cold episodes.

H-30695

Parkinson, A.J., Scott, E.N., Muchmore, H.G., Kalmakoff, J., **Decline in parainfluenzavirus specific antibody avidity preceding common cold during isolation at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.231-232, 3 refs.

In the work reported here, an attempt is made to show that quantitative changes in the virus-specific antibody binding (antibody avidity) can be measured, and that this antibody avidity may be useful as an indicator of susceptibility to infection in man. Low mean virus-specific antibody avidity was demonstrated in this population coinciding with both the midwinter outbreaks of common colds which occurred in 8 out of 22 subjects in Apr. 1978 after 10 weeks' isolation, and also in Aug. 1978 after 27 weeks of isolation. These quantitative decreases in the antibody avidity levels, and subsequent common-cold outbreaks suggest that when the antibody avidity level for the whole group falls below a certain threshold level, virus carriers previously dormant might then become active as the source of new clinical and subclinical infections within this closed community. This study suggests that high serum antibody avidity is important in maintaining immunological resistance to respiratory parainfluenzavirus infections in man.

H-30696

Meschievitz, C.K., Raynor, W.J., Dick, E.C., Mandel, A.D., **Cold severity, duration, and epidemiology in persons emerging from isolation compared to newly arrived persons at McMurdo Station,** *Antarctic journal of the United States,* 1983 18(5), p.232-234, 4 refs.

A common cold study of 191 winterover personnel emerging from six months' isolation compared to 408 newly arrived summer personnel failed to support the widely accepted theory of increased severity of and enhanced susceptibility to respiratory disease among isolated persons. The men in these groups were of similar age and ethnicity and lived together at McMurdo Station between late August and early October in 1975, 1976 and 1977. No significant differences were found between the two groups in symptom severity scores or cold duration and similar susceptibility was suggested from Antarctic cold incidence and period prevalence.

H-30791

Soroko, S.I., **Human neurophysiological mechanisms of individual adaptation in Antarctica** [Neĭrofiziologicheskie mekhanizmy individual'noĭ adaptatsii cheloveka v Antarktide], Leningrad, Nauka, 1984, 152p., In Russian. Refs. p.136-150.

Social, physiological and psychological factors influencing the the rate of man's acclimatization to the antarctic environment are studied, and pertinent literature is reviewed. The bioelectrical activity of the brain at different stages of acclimatization, with particular interest in alterations of sensory functions varying from one individual to the other, is recorded and discussed.

H-30809

Schrader, G., Klinker, L., **Abstract on medical research activities by the GDR in the Antarctic,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.41-45, With German and Russian summaries.

These activities encompassed such terms as environment, stress, strain, adaptation, and chronobiology. Adjustments made by humans to cope with such factors as increases and decreases of light, the harsh antarctic environment, and new social contacts were studied along with the physiological effects such adjustments produced.

H-30853

Bobrov, L.L., **Effect of the adaptogen bimethyl on seasonal and daily variations of physical working capacity of polar personnel** [Vliianie adaptogena bemitila na sezonnye i sutochnye kolebaniia fizicheskoĭ rabotosposobnosti poliarnikov], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.59-63, In Russian. 8 refs.

Observation of working capacity, conducted in 4 stages in 2 groups of men wintering in Antarctica—5 controls and 6 on bimethyl—are reported. Tabulated records show better performance in all 4 stages in men on the adaptogen.

H-30873

Brattsev, IU.A., **Use of anesthesia at the antarctic stations during winter** [K voprosu ob obezbolivanii v usloviiakh zimovok na antarkticheskikh stantsiiakh], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.64-65, In Russian. 1 ref.

The case history of one of the men wintering over at Novolazarevskaya Station in 1980 is reviewed, and instrumentation and tracheal intubation method used for application of anesthesia during three-hour surgery on the patient are described. It is pointed out that at present all Soviet stations in Antarctica are equipped with anesthesia supplies, instrumentation and medical personnel.

H-30883

Rivolier, J., Cazes, G., Crocq, L., **Research program of the international biomedical expedition to the Antarctic** [Le programme de recherche de l'expédition biomédicale internationale dans l'Antarctique], *Psychologie médicale,* 1984 16(3), p.465-470, In French with English summary.

The research program of an international scientific expedition organized during an Antarctic traverse is presented. The aim of this operation is to study performances and adaptation of man in conditions of stress. The protocols of the exams and studies carried out before, during and after the field period are given for the different disciplines (physiology, psychophysiology, neurophysiology, hematoimmunology, etc.). The program of psychology is related in detail. The final objective is a global knowledge of man and group. (Auth.)

H-30885

Rivolier, J., Cazes, G., Bachelard, C., **Summary of the French research in medicine and psychology conducted in the framework of French Polar Expeditions and French Austral and Antarctic Territories** [Résumé des travaux de recherche français en médecine et psychologie réalisés dans le cadre des expéditions Polaires Françaises et des Terres Australes et Antarctiques Françaises], December 1983, 59p., In French and English. 89 refs.

This is a review of the French research program which aimed to study human responses to a stressful environment and to find effective means of helping man to cope with it. The studies cited are discussed, grouped into their respective fields of interest, as follows: psychology, medicine, biometeorology, physiology, biochemistry, and nutrition. Two appendixes cover discussions titled: "The wintering mental syndrome" and "A possible thermobiological formulation of cooling power".

H-30943

Aldasheva, A.A., **Strategy of psychological adaptation under Antarctic conditions** [Strategiia psikhicheskoĭ adaptatsii v usloviiakh Antarktidy], *Fiziologiia cheloveka,* Jan.-Feb. 1984 10(1), p.16-22, In Russian. 19 refs.

Personality tests were used to determine the dynamics of psychological adaptation to winter conditions in the Antarctic in members of the 25th Soviet Antarctic Expedition. Emotional and communicative blocks correlated with the onset of the expedition, followed by emotional blocks and then intellectual blocks at the end of the period. Initial personality parameters may be used to predict adaptive behavioral responses during such long-term expeditions.

H-30944

Moshkin, M.P., **Effect of natural light regime on biorhythm in polar personnel** [Vliianie estestvennogo svetovogo rezhima na bioritmy u poliarnikov], *Fiziologiia cheloveka,* Jan.-Feb. 1984 10(1), p.126-129, In Russian. 20 refs.

Study of members of the 19th Soviet Antarctic Expedition showed changes in the circadian rhythms of body temperature, myocardial contractility, diastolic pressure, and excretion of 17-ketogenic steroids and 17-ketosteroids with decreased brightness on cloudy days. Similar effects are seen during the period of polar darkness. The rhythms of other physiologic functions did not react to changes in the light regime, or reacted differently to the reduction in natural light during polar darkness and to the reduced light in the fall. The physiological processes whose circadian rhythms were a function of the light regime were directly or indirectly linked to the regulatory action of neuroendocrine structures.

H-31083

Barabasz, A.F., **Antarctic isolation and imaginative involvement. Preliminary findings,** *International journal of clinical and experimental hypnosis,* July 1984 32(3), p.296-300, 13 refs.

Nine subjects (Group 1) were interviewed in Antarctica prior to and following 1 year of Antarctic isolation. Group 2 subjects were exposed to 3 weeks of antarctic field-site isolation and were interviewed upon return to the United States. A control group of 10 subjects was also interviewed on 2 occasions, paralleling Group 1. Group 1 showed a significant increase in imaginative involvement from pre- to post-Antarctic isolation. Group 2 showed a significantly greater level of imaginative involvement than the control subjects. The possibility that living in the Antarctic may have revived the mental processes available to these subjects as children is considered within both regression and learning explanations. (Auth.)

H-31389

Cazes, G., Crocq, L., Rivolier, J., **Study of the biographic records of subjects wintering in the Antarctic applied to selection** [Etude des antécédents biographiques des sujets hivernant dans l'Antarctique. Application à la sélection], *Revue de psychologie appliquée,* 1984 34(4), p.291-304, In French with English summary. 12 refs.

The aim of the study is to see if significant relation exists between the quality of polar wintering and the past records of the subjects. Two methods of multivariate analysis are applied to 699 biographical and medical questionnaires filled out before departure. To evaluate the field adaptation different controls are used. The results show that the differences between well- and poorly-adapted subjects are more related to socio-professional status than to personality traits. This is corroborated by a clinical study concurrently carried out. A practical purpose is foreseen. (Auth.)

H-31420

Zúñiga, A., Gill, G., **First medical investigation of an antarctic crew** [Primer estudio médico a una dotación antártica], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.29-31, In Spanish.

A psychological study of military and civilian personnel, all males, stationed at Gabriel González Videla over the winter of 1961, is reported. A change of group morale was observed, with high points occurring upon arrival and on the following spring, and the lowest during the winter months. The most persistent neurotic symptom was insomnia.

H-31483

Amuchástegui, R.M., **Three medical episodes in the antarctic campaign 1948-1949** [Tres episodios médicos en la campaña antártica 1948-1949], *Antártida,* May 1982 No.12, p.36-39, In Spanish.

Three procedures of abdominal surgery, carried out aboard research ships in antarctic waters, are described in detail.

H-31562

Matusov, A.L., **Medical service in the Soviet antarctic expeditions,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.591-596.

Some of the duties and observations of medical personnel in Antarctica are reviewed along with a description of medical facilities at Soviet antarctic stations. The pathology resulting from inadequate adaptation to the harsh living and working conditions, and from the hazards of the environment, is discussed. A strict personnel screening policy of prospective participants of expeditions is recommended.

H-31667

Biziuk, A.P., **Psychological adaptation of participants in antarctic expeditions as a function of their work experience in polar conditions** [Psikhologicheskaia adaptatsiia uchastnikov antarkticheskikh ekspeditsiĭ v zavisimosti ot opyta raboty v poliarnykh usloviiakh], *Antarktika; doklady komissii,* 1985 No.24, p.185-191, In Russian.

Results of studies on human adaptation carried out at various stations during 19th-26th Soviet antarctic expeditions are discussed. Psychological and medical tests were conducted on 607 men divided in groups by age and by length of antarctic service. Men older, and with longer antarctic experience, showed better adaptation than their younger or newly-arrived counterparts.

See also:
B-29674 B-31755 D-29469 G-30489 G-30767 K-31668

I. METEOROLOGY

I-28965

Voskresenskiĭ, A.I., Lysakov, E.P., Sveshnikov, A.M., **Mechanism of energy transformation in the south polar atmosphere** [Mekhanizm preobrazovaniia energii v atmosfere iuzhnoĭ poliarnoĭ oblasti], *Antarktika; doklady komissii,* 1982 No.21, p.5-10, In Russian. 7 refs.

A synoptic study of energy transformation in the south polar atmosphere is reported. Tabulated data shows values for inner, potential and kinetic energy, as well as for latent and sensible heat, measured at different heights and in warm- and cold-front sectors. Synoptic formations are found to be carriers of latent energy of phase transformations in water vapor carried from middle to high latitudes.

I-28966

Lysakov, E.P., **Empirical model of a south polar circulation cell** [Empiricheskaia model' iuzhnopoliarnoĭ tsirkuliatsionnoĭ iacheĭki], *Antarktika; doklady komissii,* 1982 No.21, p.11-18, In Russian. 12 refs.

After many years of atmospheric wind and temperature radio soundings, an analysis is made of the air mass fluctuations over Antarctica. The mean meridional circulation, regulating the air exchange, is quantitatively evaluated. It is shown, by the yearly averages over the coast, that a mass balance is reached between the outflow of continental air in the Earth-600 gp layer and the inflow in the 600-50 gp layer. The theoretical scheme of the circulation over the south polar region is quantitatively confirmed. The compensatory flow of the masses inside the atmospheric column presses downwards; ascending motions prevail over western Antarctica, descending over the eastern portion, with an overall predominance of descent.

I-28967

Tsigel'nitskiĭ, I.I., **Structure of atmospheric boundary layer over East Antarctica** [Struktura pogranichnogo sloia atmosfery nad Vostochnoĭ Antarktidoĭ], *Antarktika; doklady komissii,* 1982 No.21, p.19-26, In Russian. 18 refs.

On the basis of aerological sounding data collected over the years at Soviet stations, structural particularities of the atmospheric boundary layer over East Antarctica are analyzed. Quantitative evaluation is made of the parameters defining heat and dynamic conditions: height, thermal stratification, geostrophic wind, angle of wind circulation, wind shift, and Ri number. Interrelationship of various parameters is shown.

I-28968

Koshel'kov, IU.P., Kovshova, E.N., **Mean geopotential fields for the stratosphere of the Southern Hemisphere** [Srednie polia geopotentsiala dlia stratosfery iuzhnogo polushariia], *Antarktika; doklady komissii,* 1982 No.21, p.27-37, In Russian. 9 refs.

With measurements derived from radio sounding, satellite and rocket data, mean charts are plotted of heights of the 30 and 2 mb surfaces in the Southern Hemisphere. The 30 mb surface charts were compiled using data from long-term observations (1957-1977) and are found to be climatologically significant. 2 mb surface charts, based on satellite data for 1976-1978, are presented with mean zonal values of heights which are found to be in agreement with results obtained earlier.

I-28969

Kostianoĭ, G.N., Krasnova, T.M., **Statistical structure of the long wave radiation field in the antarctic atmosphere under cloudy and cloudless conditions** [Statisticheskaia struktura polia dlinnovolnovoĭ radiatsii v atmosfere Antarktidy v oblachnykh i bezoblachnykh usloviiakh], *Antarktika; doklady komissii,* 1982 No.21, p.38-47, In Russian. 11 refs.

Results of actinometric radio soundings of the atmosphere, carried out between 1966 and 1971 at Molodezhnaya and Bellingshausen stations, were used to obtain mean parameters and statistical links in the autocorrelation of ascending and descending currents of long wave radiation and the intercorrelation between radiation and air temperature and humidity, under cloudy and cloudless conditions. The greatest differences of correlations observed were linked to differences in atmospheric circulation. Statistical accuracy of the determination of radiation fluxes for three eigenvectors exceeded 90%.

I-28999

Henderson-Sellers, A., Wilson, M.F., **Surface albedo data for climatic modeling,** *Reviews of geophysics and space physics,* Nov. 1983 21(8), p.1743-1778, Refs. p.1775-1778.

The climate system is driven, primarily, by energy absorbed at the surface. Surface albedo sensitivity is incorporated into all types of climate models, and changes can lead to large feedback effects. Alterations in the extent and/or state of the cryosphere and large-scale modification of vegetation cause significant perturbations in climate model results. An improved and agreed surface albedo data set is urgently required for climate modeling. It is likely that the most appropriate means of achieving consistent and credible surface albedos is by using well-designed satellite surveillance to augment global inventories of soils and vegetation. Recommendations are made for the implementation of a new global scale observational program with the aim of providing surface albedo data at an accuracy of 0.05 within 5-10 years. Antarctic regions are tabulated and considered at various stages in the development of the model. (Auth. mod.)

I-29003

Bock, K.-H., **First antarctic voyage of the R/V *Polarstern:* establishment and operation of the shipboard weather station, synoptic work** [Erste Antarktisreise des Forschungsschiffes *Polarstern:* Einrichtung und Tätigkeit der Bordwetterwarte, synoptische Arbeit], *Seewart,* Oct. 1983 44(5), p.161-179, In German. 9 refs.

The weather station aboard R/V *Polarstern* in Atka Bay is described along with its equipment and instrumentation. The data used and area coverage of the synoptic charts are given and some of the communications capabilities, such as facsimile upper air charts and satellite photos are noted. Comments are made on the high and low pressure systems which gird and extend over the continent and satellite photos of these air masses and systems are shown. Additional remarks on the antarctic front, surface pressure analyses, and katabatic wind effects are given. Examples of radiosonde data obtained aboard ship are shown.

I-29004

Spekat, A., Fraedrich, K., **Further studies on single station climatology: (iii) Time spectral analysis of Halley Bay (Antarctic) rawinsonde data,** *Contributions to atmospheric physics: Beiträge zur Physik der Atmosphäre,* May 1983 56(2), p.213-220, In English with French and German summaries. 9 refs.

This single station climatology describes seasonal means, variances, covariances, and the spectral transformations of time series of rawinsonde observations at selected sites. Analyses of stations in the western and eastern part of the Eurasian continent and in the north polar region are extended to Halley Bay in the Antarctic. Three time scales of fluctuation intensities appear in Halley Bay rawinsonde data, but only the long (5-10 days) and short (5 days) period disturbances are significant. Short period disturbances in the vicinity of Halley Bay, their amplitudes and phase relationships are discussed in some detail; they can penetrate to the surface, lift the inversion, lead to cloud- and, in summer, to fog formation; furthermore, weaker (stronger) low level winds occur before (after) the passage of the surface trough. (Auth.)

I-29005

Han, Y.-J., Lee, S.-W., **Analysis of monthly mean wind stress over the global ocean,** *Monthly weather review,* Aug. 1983 111(8), p.1554-1566, 24 refs.

The monthly wind stress over the global ocean has been calculated using updated climatological monthly mean wind data. The effect of the variability of the wind has been incorporated by using the wind speed frequency estimated from the observed mean and variance in a Gaussian distribution model. The spatial and temporal data gaps in the high-latitude oceans have been filled with surface winds estimated from the monthly mean geostrophic winds. The calculated stress data have revealed a number of interesting features that were not well resolved in earlier studies. A rapid transition from a winter to summer stress pattern in the north Indian Ocean is especially notable, and large-scale gyral patterns in the Antarctic Ocean and their seasonal variations are now well-defined. The monthly wind-stress curl calculated from the present stress data is in good agreement with earlier calculations, although the present curl field reveals a more detailed structure, especially in high latitudes and in the tropics. (Auth.)

I-29040

Allison, I., Morrissey, J.V., **Automatic weather stations in the Antarctic,** *Australian meteorological magazine,* June 1983 31(2), p.71-76, 6 refs.

Between 1980 and 1982 a number of automatic weather stations was deployed in the Antarctic region by the Antarctic Division, Department of Science and Technology. Data from these platforms are processed via the ARGOS data collection and location system utilizing satellites. Despite some initial problems, the stations have proved most successful with the longest running station having provided over 12 months' data. This paper briefly describes the design and deployment of these observatories, compares data from AWS with that collected manually, and discusses the preliminary data received from the stations. (Auth.)

I-29083

Pomazanova, N.P., Kasich, T.G., Kovalenko, L.A., Lednichenko, V.A., **Characteristics and type designation of atmospheric processes in the antarctic Indian Ocean** [Osobennosti atmosfernykh protsessov i ikh tipizatsiia v antarkticheskoĭ oblasti Indiĭskogo Okeana], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.19-25, In Russian with English summary. 8 refs.

The main characteristics of the atmospheric circulation over the antarctic Indian Ocean are analyzed. To obtain typical diagrams of the three-dimensional circulation of water, synoptic processes were classified in the area of 55-70 S and 20-140 E, on the basis of daily charts of atmospheric surface pressure, in December-March 1968-1972. The main synoptic processes are defined as either a zonal or a meridional type. The latter is divided into five subtypes. An analysis of the recurrence periods, stability and succession of the types involved indicates that synoptic processes vary greatly in the Indian Ocean sector in summer. (Auth.)

I-29100

Robinson, E., Clark, D., Cronn, D.R., Bamesberger, W.L., **Stratospheric-tropospheric ozone exchange in Antarctica caused by mountain waves,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,708-10,720, 23 refs.

This study presents results of a NSF C-130 research aircraft flight over the Ellsworth Mountains of Antarctica in December 1978. The aircraft was in the study area for more than 6 hours and flew 14 flight tracks generally parallel to the mountain ridge at 4 primary altitudes between 7.3 and 8.7 km, MSL. Data analyses included horizontal and cross-sectional fields of temperature, potential temperature, ozone, frost point, and wind. The results showed that over the mountain area there was a pattern of changes in theses variables that could be explained by the apparent vertical motion expected to occur in mountain wave situations. In this case there was vertical displacement of air parcels across the tropopause zone that was shown by ozone and potential temperature patterns. In the patterns at various constant levels the measured values appear to be organized into a series of bands or zones characteristic of wave troughs and ridges oriented across the mean wind direction and parallel to the terrain ridges. Ozone flux calculations were made by using concentrations measured in upwind and downwind zones. (Auth. mod.)

I-29101

Chýlek, P., Ramaswamy, V., Srivastava, V., **Albedo of soot-contaminated snow,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,837-10,843, 24 refs.

A new model is presented of snow containing impurities (graphitic carbon). Submicron-sized soot particles are supposed to be distributed randomly throughout the volume. Using the mixing rule for a dielectric constant of a composite medium, we calculate the refractive index of a snow-soot mixture. Then we obtain the single scattering albedo and the asymmetry factor. Using the delta-Eddington approximation, the reflectivity (albedo) of a snow layer is determined within a specified wavelength range. The calculated spectral albedos and the deduced amounts of graphitic carbon agree well with field measurements. Data from the South Pole were used in this study.

I-29102

Nguyen, G.C., Bonsang, [illegible] Gaudry, A., **Role of the ocean in the global atmospheric sulfur cycle,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,903-10,914, 60 refs.

The background atmospheric SO2 concentration above the sea surface has been established at 35 pptv. We have shown that one of the mechanisms of SO2 formation is the biogenic production of reduced organic sulfur compounds in the ocean. Dimethyl sulfide (DMS) has been observed in oceanic areas, with concentrations widely ranging in surface waters and in the marine atmosphere. This compound is emitted into the atmosphere and oxidized there by photochemically induced processes. That leads partly to SO2 formation, and subsequently, to sulfate. This hypothesis is corroborated by a correlation between atmospheric SO2 concentrations and the relation between atmospheric SO2 concentrations and biological activity. The flux of sulfur by this process and by sea spray is estimated as being from 71 to 116 million tons/yr. Sulfur data over and produced by the southern oceans was gathered from the vicinities of the several subantarctic islands and in some regions as far south as 62S. (Auth. mod.)

I-29103

Mook, W.G., Koopmans, M., Carter, A.F., Keeling, C.D., **Seasonal, latitudinal, and secular variations in the abundance and isotopic ratios of atmospheric carbon dioxide. 1. Results from land stations,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,915-10,933, 21 refs.

Between March 1977 and February 1982, 517 samples of air were collected in 51 glass flasks at four stations in the northern hemisphere near the Pacific Ocean and at the South Pole. First, the CO2 concentration of each sample was determined by nondispersive infrared gas analysis, and then the 13-C/12-C and 18-O/16-0 ratios of the cryogenic extracted CO2 were determined with a triple collector mass spectrometer. For each station the secular trend and seasonal variation in 13-C/12-C ratio have been established as a function of CO2 concentration. Details of the variations are given for each station. (Auth. mod.)

I-29105

Löffler, E., **Macquarie Island, a wind-formed natural landscape in the Subantarctic** [Macquarie Island—eine vom Wind geprägte Naturlandschaft in der Sub-Antarktis], *Polarforschung,* 1983 53(1), p.59-74, In German with English summary. 37 refs.

The two dominant environmental factors on Macquarie Island are the constantly low temperatures and the high wind velocities. The low temperatures are the overall limiting factors for the vegetation as a whole while the exposure to wind determines the distribution of the vegetation types and of small scale geomorphological features. The hard cushion formation (feldmark) occupies most of the wind exposed plateau area. With decreasing wind exposure the hard cushions are replaced by herb fields, bogs or fens depending on the height of the ground water table. The coastal areas, which are generally less wind exposed, are covered by *Poa foliosa* grassland. While wind exposed slopes exhibit a high degree of slope mobility, the lee slopes are much more stable and are characterized by large stable terraces. Oblique terraces occur on slopes that have neither a clear leeward nor windward aspect and are transitional forms between the unterraced windward slopes and the terraced lee slopes. (Auth.)

I-29108

Simmonds, I., Lin, Y.-B., **Topographic and thermal forcing in a general circulation model of the Southern Hemisphere—January case,** *Melbourne (Australia). University. Department of Meteorology. Publication,* Sep. 1983 No.24, 88p., Refs. p.83-88.

We have used a spectral general circulation model of the Southern Hemisphere to examine aspects of the role of topography and thermal forcing in determining January climate in that hemisphere. A control run of the model is compared with separate anomaly experiments in which all topography was removed, Antarctica only removed, and finally in which the sea surface temperature was set to its observed zonal average at each latitude. The topography anomaly experiments produced little gross changes to the surface pressure field. In particular, the location of the sub-tropical highs does not seem to be directly linked to the presence of the topography. The 'sub-Antarctic' trough is also present in all the runs. The sub-tropical highs tend to extend across all the ocean basins when zonal sea surface temperature variation is removed. At upper levels, the effects of topography anomalies are most noticeable at higher latitudes and the amplitude of the stationary waves there are reduced. Various analyses performed here cast light on these and other effects of forcing in the Southern Hemisphere. (Auth.)

I-29148

Borzenkova, I.I., **Global temperature trend in the Cenozoic,** *Soviet meteorology and hydrology,* 1981 No.12, p.17-25, Translated from Meteorologiia i Gidrologiia. 30 refs.

The results of paleotemperature determinations made by oxygen-isotope analysis of the remains of marine planktonic and benthic microfauna are generalized, along with results of paleobotanic analyses of fossil flora from the Cenozoic (the last 60-65 m. y.). Analysis of these materials indicates a progressive lowering of temperature over the entire period at all latitudes in both hemispheres. Against the background of the general cooling trend, there have been two warming periods (the Eocene and Early Miocene maxima) that are observed at all latitudes. The Southern Hemisphere glacial cover formed about 15-11 m. y. a., while the Northern Hemisphere remained ice-free until the middle of the Pliocene (3-3.5 m. y. a.). Seasonal Arctic Basin ices may have existed throughout the entire Pliocene (4.5-5.0 m. y. a.), while the permanent ice cover formed no earlier than 0.8-0.9 m. y. a. (Auth.)

I-29165

Kottmeier, C., **Dynamic and thermal structure of inversions over antarctic ice surfaces** [Dynamische und thermische Struktur von Inversionen über antarktischen Eisflächen], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.30-32, In German.

Using range finding techniques, a determination was made of the wind speed and direction and temperature profiles at Georg von Neumayer Station over the ice sheet to a height of 300 m. The work included the erection and installation of a fully instrumented mast 45 m tall. The techniques, the technical work, and the measurements, analysis and evaluation are discussed.

I-29167

Wagenbach, D., Junghans, H.G., Volpp, J., **Long term measurements of atmospheric trace elements in air and firn samples in the vicinity of Georg von Neumayer Station** [Langzeitmessung atmosphärischer Spurenstoffe an Luft und Firnproben im Bereich der Georg-von-Neumayer-Station], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.36-44, In German.

Background data for the research are given, special reasons for conducting the programs are defined, and goals are established; technical gains and work facilities are described; sampling methods and objectives are given; sampling programs for summer field trips and the winter season are outlined.

I-29171

Winkler, P., **Surface ozone in the maritime atmosphere** [Das Oberflächennahe Ozon in der maritimen Atmosphäre], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.71-75, 7 refs., In German.

Results of ozone measurements during voyages made by *Walther Herwig, Meteor,* and *Polarqueen* from 1977-1983 are reported. Data from the *Polarstern* 1983 voyage has not yet been analyzed. Measurements were taken between 55N and 70S and results from the various regions are discussed. Measurements on this voyage of *Polarstern* were taken at Georg von Neumayer Station as well as at sea. Results are compared in a graph.

I-29187
Tauber, G.M., **Hydro-meteorological investigations in Antarctica by the State Oceanographic Institute** [Gidrometeorologicheskie issledovaniia GOINa v Antarktike], Issledovaniia okeanov i moreĭ, edited by F.S. Terziev, Moscow, Gidrometeoizdat, 1983, p.213-221, In Russian. 49 refs.

Literature containing data collected in surveys carried out in the Antarctic by Soviet whaleboats and the Soviet State Oceanographic Institute (GOIN) is reviewed. It covers detailed characteristics of antarctic waters and climate; type of atmospheric processes in the Southern Hemisphere, including the distribution of cyclones and anticyclones; classification of antarctic icebergs; recording of yearly and seasonal temperature changes of the surface waters; observation of antarctic sea ice regarding its abundance, changes, and the influence of winds on its formation; effects of weather and oceanographic conditions on the migration and distribution of whales; and katabatic wind characteristics.

I-29189
Grechko, E.I., Dianov-Klokov, V.I., **Spectroscopic measurements of the "additional absorbing mass" in total and partial cloudiness** [Spektroskopicheskie izmereniia "dopolnitel'noĭ pogloshchaiushcheĭ massy" v sploshnoĭ i razorvannoĭ oblachnosti], *Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana,* 1983 19(2), p.156-162, In Russian with English summary. 3 refs.

Shipboard measurements of "additional absorbing mass" (delta m) were made related to multiple scattering of photons in solid cloudiness in the Antarctic region. The averaged values imply an increase of absorbed solar radiation by a cloudy atmosphere up to 30-40% in comparison with the amount calculated without allowance for multiple scattering. Data for partial cloudiness in the equatorial region show a nonlinear dependence of delta m on the amount of cloudiness.

I-29195
Nishimura, H., Inoue, J., Satow, K., **POLEX-South data, Part 5: Micrometeorological data at Mizuho Station and temporary stations in Mizuho Plateau, Antarctica in 1981,** *Japanese Antarctic Research Expedition. JARE data reports,* Nov. 1983 No.85 (Meteorology 14), 182p., 6 refs.

Data measurements consisted of: air temperature and wind speed at seven levels between 0.5 m and 30.0 m; snow temperature at eight levels between 0.1 m and 10.4 m depth; and wind direction at 2.0 m and 30.0 m. Methods of observation and instrumentation are described; capabilities of the sensors, locations of the Mizuho Plateau stations, and the periods of observations are given in tables. The raw data which comprises the bulk of the report are given in tabular form using procedures described for data processing and evaluation. The symbology used in the tables is explained.

I-29196
Takahashi, S., Ohmae, H., Ishikawa, M., Katsushima, T., Nishio, F., **Meteorological data at Mizuho Station, Antarctica, 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Nov. 1983 No.86 (Meteorology 15), 97p.

Synoptic weather observations for Mizuho Station are arranged in tabular form for 1982 and for Jan. 1-24, 1983. Observations are made of standard weather elements using standard scales and symbology. These are preceded by monthly and daily summaries. Instrumentation is briefly described and the symbols used in the tables are explained.

I-29231
Andreas, E.L., Tucker, W.B., III, Ackley, S.F., **Atmospheric boundary-layer modification, drag coefficient, and surface heat flux in the antarctic marginal ice zone,** *Journal of geophysical research,* MP 1667, Jan. 20, 1984 89(C1), p.649-661, 71 refs.

During a traverse of the Antarctic marginal ice zone (MIZ) near the Greenwich Meridian in October 1981, we launched a series of radiosondes along a 150-km track starting at the ice edge. Since the the wind was from the north, off the ocean, these radiosonde profiles showed profound modification of the atmospheric boundary layer (ABL), as the increasing surface roughness decelerated the flow. The primary manifestation of this modification was a lifting of the inversion layer with increasing distance from the ice edge by the induced vertical velocity. But there was also a cooling of the stably stratified mixed layer below the inversion and a consequent flux of sensible heat to the surface that averaged over 200 W/sq m. The magnitude of this flux suggests that atmospheric heat transport plays a significant role in the destruction of ice in the Antarctic MIZ. Using the rising of the inversion and ABL similarity theory, we estimated the neutral stability drag coefficient across the MIZ increased from its open ocean value, .0012, at the ice edge to .004 at 80-90% ice concentration. We present an equation for this dependence of drag on ice concentration that should be useful for modeling the surface stress in marginal ice zones. (Auth.)

I-29235
Saxena, V.K., **Evidence of the biogenic nuclei involvement in Antarctic coastal clouds,** *Journal of physical chemistry,* Oct. 13, 1983 87(21), p.4130-4134, 26 refs.

Antarctic coastal clouds that form as a result of advection of marine air over the Ross ice shelf during the austral summer were investigated during a field experiment conducted in October-November 1980. Observational data on the spatial and temporal distribution of cloud condensation nuclei (CCN) activity spectra, Aitken nuclei concentrations, and chemical characteristics of the cloud water that was collected through direct aircraft penetrations of clouds were obtained. The collected cloud water was examined by a Perkin-Elmer infrared spectrophotometer, electron microscope, and X-ray energy dispersive analysis. Part of the water sample was allowed to stand at room temperature under diffused light. These analyses demonstrated, first, the growth of an algae, suspected to be *Planktonema lauterbornii,* in the "clean" Antarctic cloud water, second, the presence of proteinaceous matter as indicated by the infrared absorption spectra, and third, an abundance of ionically bonded potassium chloride salt rather than sodium chloride. (Auth. mod.)

I-29260
Kusunoki, K., ed, **Proceedings of the Fifth Symposium on Polar Meteorology and Glaciology,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, 227p., For individual papers see 38-2001 through 38-2015 or F-29266, F-29271, F-29272, F-29274 through F-29277, I-29261 through I-29265, I-29267 through I-29270, I-29278 and J-29273.

The results of field research in 1981 are presented together with the analyses of data obtained in the previous years. This symposium also aimed at the presentation of preparatory work to contribute to the internationally coordinated Middle Atmosphere Programme (MAP);

the Japanese MAP in the Antarctic is to be implemented in 1982-1985. The main topics of the symposium are: clouds and snow crystals, synoptic meteorology, boundary layer meteorology, radiation, snow cover, ice sheet, climatic change, sea ice and oceanography, and middle atmosphere. Fifty-three papers were presented and the present volume contains 22 original papers and 26 abstracts. These papers are arranged in the order of scientific areas of meteorology, oceanography, glaciology, and MAP-related subjects. (Auth.)

I-29261

Ishikawa, N., Kobayashi, S., **Climatological features of Mizuho Station in katabatic wind zone, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.1-15, 18 refs.

Climatological features of Mizuho Station are described using seasonal variations in, and frequency distributions of meteorological elements for individual months as well as periodicities of individual variations and cross-correlations obtained by spectral analyses on the basis of data collected in 1980. The findings follow: Air pressure obtained at Mizuho Station decreases and has its minimum in winter. On the other hand, it maintains an almost constant value at Showa Station during the year; therefore, the pressure difference between Mizuho and Showa increases in winter. Air temperature shows a remarkable daily variation in summer. In winter this short-time periodic variation disappears and the the semi-long periodicity of about five days obtains. A strong wind blows almost constantly throughout the year, the annual mean being about 11 m/s. A significant cross-correlation is shown between air temperature at Mizuho and air pressure at Showa in winter. (Auth.)

I-29262

Ohata, T., **Atmospheric conditions for extremely low air temperatures at Mizuho Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.16-23, 4 refs.

For the occurrence of extremely low air temperature at Mizuho Station, the following conditions are required. The wind direction at 600 mb which can be considered to be the geostrophic flow above the inversion layer, should be from south to west (S-W) at Showa Station. The wind direction at Mizuho Station is from SE-SW, meaning the synoptic scale pressure gradient from SW-NW to NE-SE which is in the opposite direction of the fall line there. The moisture content of the air mass should be low so that there is no cloud formation. Also the air temperature has to be at least lower than the monthly mean. If these conditions are satisfied, a quite strong temperature inversion will occur near the surface, resulting in extremely low surface air temperature. Wind speed at the surface level is only a little lower than the average. (Auth.)

I-29263

Inoue, J., Nishimura, H., Satow, K., **Climate of the interior of Mizuho Plateau,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.24-36, 14 refs.

The scheme and results of the mobile meteorological observation on Mizuho Plateau are reported. The surface wind and temperature at 4 temporary stations on the traverse route were compared with those of Mizuho Station during the same period. Each station is classified under the category of cold katabatic or cold interior climate though the transitional status is revealed for the latter. Evident decrease of surface wind inland is due to the decrease in the surface inclination. The increase in the temperature lapse rate inland resulting from the lowering of minimum temperatures is caused by the weakness of the surface wind when the minimum temperature is present as well as by the light inland breeze. It is also caused by the decrease of the effect of synoptic disturbances. The surface prevailing wind at V142 (upper end of the plateau) originates from further inland. The small inversion and the locally produced northerly wind was present when the general wind was blocked at V142. The cooling of the atmosphere over V142 begins either from the surface or from the height of lower troposphere. (Auth. mod.)

I-29264

Kobayashi, S., Ishikawa, N., Ohata, T., Kawaguchi, S., **Observations of an atmospheric boundary layer at Mizuho Station using an acoustic sounder,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.37-49, 19 refs.

Acoustic sounding was used in observing a katabatic wind layer at the lowest few hundred meters over Mizuho Station. Some examples of acoustic echo return showed the structure of surface inversions in connection with a katabatic wind and the behavior of breaking waves, e.g., a "herringbone" type structure described as an unstable wave. Observations disclosed that wave-like motion exists in a layer between the heights of 100 and 300 m and it has a shorter period than the calculated value from the Brunt-Väisälä frequency. This discrepancy is explained by a simple two-dimensional wave equation, considering the presence of mean atmospheric flow. (Auth.)

I-29265

Adachi, T., **Numerical simulation of strong katabatic winds at Showa and Mizuho Stations, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.50-60, 18 refs.

The vertical profiles of the wind speed and air temperature and the wind spiral are studied in the case of the typical strong katabatic wind observed by radiosondes at Showa and Mizuho Stations. The vertical profiles of the two horizontal wind components, eddy diffusivity, shear stress and local value of Monin-Obukhov length are calculated with the numerical model of the katabatic winds developed by the author in 1979. The numerical solutions of the katabatic wind profiles agree well with the observed ones at Showa Station. (Auth.)

I-29267

Kawaguchi, S., **Effective infrared emissivity of clouds in Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.70-76, 14 refs.

Emissivity values of low and middle clouds deduced from 26 radiometersonde ascents carried out during 1967-1969 at Showa Station are presented. The effective emissivity was dominated more by the radiation field of the cloud circumference than by the radiative property of cloud itself. The emissivity increased with increasing cloud thickness up to 800-1000 m, and thereafter had a high constant value about 0.95 for the downward flux. The emissivity showed a decreasing tendency with increasing cloud base height. The IR radiative cooling of cloud is very notable; a cooling rate of 10 degrees C/day was found in the upper part of the clouds and zero cooling rate or heating was found in the lower part. (Auth. mod.)

I-29268

Matsubara, K., Ohata, T., Kawaguchi, S., **Turbidity over the Indian Ocean,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.77-84, 18 refs.

Atmospheric turbidity measurements were carried out over the Indian Ocean by a sunphotometer during the voyage from Tokyo to Showa Station, Nov.-Dec. 1979 and also from Showa Station to Port Luis, Feb.-Mar. 1981. Between 17 N and 67 S the highest value of aerosol optical thickness was observed in the east end of the Indian Ocean close to the northwest coast of Australia, and the lowest value was in the region south of 20 S in the Indian Ocean. Aerosol optical thickness in low turbidity conditions depends on the wind speed, whereas in high turbidity conditions the dependency is not clear. (Auth. mod.)

I-29269

Matsubara, K., Kawaguchi, S., **Spectral extinction measurement by sunphotometer at Showa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.85-93, 22 refs.

Spectral measurement of direct solar radiation was made by sunphotometer at Showa Station, January 1980 through January 1981. Average aerosol optical thickness was 0.023 with a maximum in October, minimum in November. Monthly mean Ångström turbidity coefficient *beta* ranges from 0.0045 to 0.0207 and *alpha* from 1.27 to 2.15. This result is in good accordance with recent measurements of optical thickness in Antarctica made by other researchers. The most important finding is that turbidity at Showa Station was fairly constant throughout a year while spectral extinction exhibited marked seasonal variation. It was also found that the seasonal variation of spectral extinction is caused by the seasonal change of aerosols which results from seasonal differences in the origin of air masses. (Auth. mod.)

I-29270

Wada, M., Takeda, T., **Characteristic features of clouds in Antarctica as observed at Showa Station,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.94-102, 16 refs.

The relationship between atmospheric conditions and cloud types in Antarctica was investigated on the basis of aerological data at Showa Station in 1979 and 1980. When a low pressure passed near Showa Station, type I clouds in which the vertical profile of temperature was nearly moist adiabatic were most popular. These clouds were formed in both January and July. Type II clouds which were found in an isothermal layer were frequently observed in July, but they hardly appeared in January. Clouds of this type are characteristic of the polar regions. One of the reasons why the number of cloudy days in July is more than that in January is the appearance of type II clouds in July. (Auth.)

I-29278

Ito, T., Ikegami, M., Kanazawa, I., **Aitken nuclei sonde with constant expansion ratio irrespective of ambient pressure,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.185-190, 13 refs.

A new type of Aitken nuclei sonde is reported. The sonde consists of an expansion fog chamber, which is similar in principle to the Pollak counter or the Aitken counter, as a measuring device of Aitken nuclei concentration. The fog chamber is very compact and automatic and it is constructed to keep the expansion ratio constant irrespective of ambient pressure. The constant expansion ratio is an essential requirement for the measurement of Aitken nuclei concentration at different heights by a balloon or an airplane. The variation of measured values during 50 measurements of the same air sample is smaller than 3% of the mean. Two identical fog chambers in the present sonde give Aitken nuclei concentrations which agree within 50/cu cm for the concentration range covering between about 200 and about 2000/cu cm. A nuclei measuring signal is inserted into rawinsonde signal, which is transmitted to a ground station, every minute for 10 s. The total weight of a sonde is 9 kg, comprising a 5 kg fog chamber, a 3.5 kg battery and a 0.5 kg rawinsonde.

I-29286

Raper, S.C.B., Wigley, T.M.L., Jones, P.D., Kelly, P.M., Mayes, P.R., Limbert, D.W.S., **Recent temperature changes in the Arctic and Antarctic,** *Nature,* Dec. 1, 1983 306(5942), p.458-459, 11 refs.

Monthly mean station surface air-temperature data have been objectively analysed to produce time series of temperature anomalies for the Northern Hemisphere (1881-1980), the Arctic (1881-1980), and the Antarctic (1957-82). A comparison of recent changes in these three regions is made here. Previously published series have been updated to 1982. Changes in Arctic temperatures since about 1966 and in Antarctic temperatures since 1960 show significant warming trends. For the period from 1975 to 1982 there is a high positive correlation between temperature variations in the Arctic and Antarctic. (Auth.)

I-29294

Lutsenko, E.I., Priamikov, S.M., Sarukhanian, E.I., Smirnov, N.P., **Semi-annual oscillations of thermobaric fields in the northern and southern hemispheres** [Polugodovye kolebaniia termobaricheskikh poleĭ v severnom i iuzhnom polushariiakh], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1983 Vol.371, p.6-18, In Russian. 16 refs.

Analysis of measurements of pressure and temperature at various levels shows that the closest link between semi-annual geopotential oscillations and semi-annual solar tide is found at 500 mb, decreasing toward the Earth's surface and the upper edges of the troposphere.

I-29295

Lutsenko, E.I., **Annual oscillations of thermobaric fields in the troposphere of the northern and southern hemispheres** [Godovye kolebaniia termobaricheskikh poleĭ v troposfere severnogo i iuzhnogo polushariĭ], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1983 Vol.371, p.34-47, In Russian. 18 refs.

Maximal amplitudes of annual pressure waves at sea level are caused by seasonal pressure increases over certain regions of the globe. Allowing for significant physiographic variations and the seasonal changes of solar radiation in the northern and the southern hemispheres, the recorded synchronousness of annual pressure fluctuations is considered a manifestation of interaction of atmospheric processes between the two hemispheres.

I-29296

Rudiaev, F.I., **Influence on climate by the external gravity field of the Earth** [Klimatoobrazuiushchaia rol' vneshnego gravitatsionnogo polia Zemli], *Leningrad. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1983 Vol.371, p.62-78, In Russian. 19 refs.

Distribution of air masses showing a normal gravity potential, and the latitudinal distribution of atmospheric pressure, are studied. Graphs of gravity anomalies and the pressure fields of both hemispheres are shown, and the mechanism of the link between the Earth's rotation and certain characteristics of atmospheric and oceanic circulation is discussed.

I-29390

McKenzie, R.L., Johnston, P.V., **Stratospheric nitrogen dioxide measurement at Arrival Heights, Antarctica,** *New Zealand antarctic record,* 1983 5(2), p.12-15, 5 refs.

Since August 1982 an instrument installed by the PEL Atmospheric Station, D.S.I.R., Lauder has been obtaining spectral data from scattered sunlight at Arrival Heights, Ross Island, Antarctica. We describe the instrumentation and technique used to extract information about stratospheric nitrogen dioxide. Some preliminary springtime results are presented. (Auth.)

I-29405

Iwasaka, Y., **Laser radar system for measurement of the middle atmosphere at Syowa Station in Antarctica,** *Antarctic record,* Dec. 1983 No.80, p.1-13, In Japanese with English summary. 1 ref.

A multiwavelength laser radar system was installed in 1983 in cooperation with the International Middle Atmosphere Program (MAP). The laser radar can simultaneously shoot two kinds of laser pulses, the fundamental wave and the second harmonic wave, by means of a ruby laser with regulated repetition frequencies and receive scattered light by a telescope with a 50 cm lens. The measurement is by using a photon counter for each wave and an A-scope for the fundamental wave. A test observation was successfully made in Japan and it showed remarkable increases of the stratospheric aerosol due to the volcanic eruption of Mt. El Chichon. It was also inferred that the size distribution of the particles in the aerosol layer is inhomogeneous. (Auth.)

I-29429

Zhdanov, L.A., **Atmospheric processes over western Antarctica** [Atmosfernye protsessy nad Zapadnoĭ Antarktikoĭ], *Antarktika; doklady komissii,* 1980 No.19, p.173-187, In Russian. 7 refs.

Typical regional elemental synoptic processes, from meteorological and satellite data of 1972-1973 at McMurdo Station, are described. An earlier published method used for similar studies in eastern Antarctica was also used in this investigation of the western portion of the continent. Orographic characteristics of the McMurdo Sound region are discussed, and the seasonal variations of atmospheric circulation—with graphic representation of cyclone and anticyclone formations, kinematic charts and photographs—are presented. Results are used for the development of a synoptic statistical method to anticipate dangerous weather conditions and for the compilation of short-range weather forecasts.

I-29434

Desa, E., Selvam, A.P., Prabhu Desai, R.G., Nayak, M.R., Tengali, S., **Automatic recording weather station,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.18-29, 7 refs.

An automatic weather station erected by the First Indian Antarctic Expedition is described. A simplified block diagram of the system electronics presents an overview of the sensors and associated electronic hardware. A detailed flow-chart of the acquisition and storage software is also presented together with details of the processor module, analog board, clock and power supply circuits and tape recorder interface. Finally, a typical print-out obtained at the site of *Dakshin Gangotri* is reproduced. (Auth.)

I-29435

Desa, E., Nayak, M.R., Prabhu Desai, R.G., Selvam, A.P., **Antarctic winter—as recorded at *Dakshin Gangotri*,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.30-40, 4 refs.

The data tape of the automatic weather recording station set up by the first expedition was recovered by the second expedition. The station performed well and the entire tape shows valuable and consistent recorded data. The temperature records show progressive cooling with the advance of the antarctic winter with a minimum recorded temperature of -29 deg C. The wind data is consistent with published results of long term experiments showing winds generally from the South and South East sectors. The maximum wind speed recorded in the 6 months of recording was 85 mph from a southerly direction. Some qualitative explanations are put forward for the observations and the paper concludes with a set of recommendations for future experiments. (Auth.)

I-29444

Sen Gupta, R., Qasim, S.Z., **Measurement of aerosol particles along a section from 8 N latitude to Antarctica in the southwestern region of the Indian Ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.100-105, 12 refs.

Measurements of aerosol particles along a transect in the southwestern Indian Ocean showed a gradual decrease of the particles towards Antarctica. Peaks were recorded at places where the air coming from other continents seemed to influence the atmosphere. The observed peak in the zone of Antarctic Convergence may be due to the effect of the flow of surface air from Antarctica towards the equator. Katabatic wind is probably the cause of another peak observed near the antarctic continent. An inverse relation has been found between the wind speed and aerosol content which is presumably due to "scrubbing effect" and dispersion. (Auth.)

I-29501

Dolgin, M.I., **Scheme to determine cloud parameters using data of upper air soundings in Antarctica** [Skhema parametrizatsii oblachnosti po dannym aerologicheskogo zondirovaniia atmosfery v Antarktide], *Meteorologiia i gidrologiia,* 1983 No.11, p.47-51, In Russian. 13 refs.

A scheme for the determination of vertical borders of cloud layers from data on atmospheric distribution of temperature and moisture is presented. The method is based on results obtained from actinometric soundings at Molodezhnaya Station.

I-29502

Mokhov, I.I., Petukhov, V.K., Rusin, I.N., **Sensitivity of mass transfer at the antarctic ice sheet surface to climatic changes** [Chuvstvitel'nost' massoobmena na poverkhnosti lednikovogo shchita Antarktidy k klimaticheskim izmeneniiam], *Meteorologiia i gidrologiia,* 1983 No.11, p.52-59, In Russian. 22 refs.

The sensitivity of mass transfer to climatic changes is calculated on the basis of a thermodynamic model of air masses and energy balance in the surface atmosphere. The relationship between mass transfer and atmospheric radiation and temperature is determined. Model calculations agree with the empirical data obtained in the course of the year. The rate of sensitivity of mass transfer to CO2 concentration changes in the atmosphere agrees with results of calculations based on climatic models of the general circulation.

I-29507

Pinto Peixoto, J., Corte-Real, J.A.M., **Energetics of the general circulation of the atmosphere in the Southern Hemisphere during the IGY, Part II: the cycle of the energetics of the atmosphere in the Southern Hemisphere,** *Archives for meteorology, geophysics, and bioclimatology. Ser. A,* 1983 32(1-2), p.1-21, 25 refs.

Tentative box diagrams of the energy cycle are given for summer, winter and annual mean conditions, on the basis of an assumption concerning the dissipation of eddy kinetic energy. The general features of the energy cycle in southern hemisphere are similar to those observed in the northern hemisphere; the intensity of the general circulation is higher in winter. The rate of generation of eddy available potential energy, indirectly estimated, is higher in summer while the baroclinic process of transformation of zonal available potential energy into eddy available potential energy is more intense in winter. The antarctic continent seems to play an important role in the energetics of southern hemisphere; its contributions to the generation of zonal available potential energy and to the conversion of this form of energy into eddy available potential energy are noteworthy. (Auth. mod.)

I-29606

Hall, K., **Reconstruction of the Quaternary ice cover on Marion Island,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.461-464, 20 refs.
DLC QE350.A57 1983

Evidence in favour of extensive glaciation on sub-Antarctic Marion Island is presented. Available data indicate three phases of glaciation, each comprising a sequence of stades and interstades. The island stratigraphy is shown and the major glacial deposits briefly described. From the available evidence, particularly the moraines, a number of former glaciers are reconstructed. Temperature fell between 3 and 6.4 C at the glacial maximum, with an equilibrium line altitude depression of 650 m and an accumulation area ratio of 0.6. The interglacials are marked by tectonism and volcanism as a response to isostatic readjustment. Temperatures were similar to present with extensive pedogenesis and plant colonisation. High glacier velocities are indicated to compensate for large ablation rates. Glaciation was initiated by precipitation falling as snow due to the northward shift of the Antarctic Convergence.

I-29647

Aver'ianov, V.G., **Moisture and heat balance of the surface-atmosphere system as a glacioclimatological indicator of antarctic glaciation** [Balans vlagi i tepla sistemy poverkhnost'-atmosfera kak gliatsioklimaticheskiĭ pokazatel' oledeneniia Antarktidy], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.30-38, In Russian. 10 refs.

Absolute values of heat and moisture balance of the antarctic ice cover surface and air are presented. The balance structure is analyzed, heat loss and the changes of the heat supply in the earth's atmosphere are correlated and conclusions are drawn concerning the stability of the present state of antarctic glaciation.

I-29648

Voskresenskiĭ, A.I., **Climate monitoring in Antarctica** [Klimaticheskiĭ monitoring v Antarktide], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.38-47, In Russian. 13 refs.

Basic requirements for organizing climate monitoring in Antarctica are examined, and two favorable conditions are pointed out: the distance of Antarctica from the sources of atmospheric pollution and the presence of the vast body of water surrounding it and separating it from other continents. The most significant climatological factors, as well as the structural characteristics of the atmosphere influencing climate monitoring, are described. First results of observations of atmospheric aerosols, moisture exchange, radioactivity, precipitation, etc., are presented.

I-29649

Ryzhakov, L.IU., Savitskiĭ, G.B., **Synoptic observations in Antarctica and prospects of their development** [Sinopticheskie issledovaniia v Antarktike i perspektivy ikh razvitiia], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.47-52, In Russian. 21 refs.

Principal steps in the development of soviet synoptic observations in Antarctica in the last 25 years are described. Statistics on various charts prepared and forecasts issued at Molodezhnaya Station by the 12th, 19th and 23rd Soviet Antarctic Expeditions, are tabulated.

I-29698

Kuhn, M., **Steering of global climate by the polar regions** [Die Steuerung des globalen Klimas durch die Polargebiete], *Geographische Rundschau,* Mar. 1983 35(3), p.112-118, In German. 23 refs.

Several factors affecting climate control are pointed out and discussed as they operate in both polar regions. These include: the direct influence of polar outbreaks; direct thermal advection; meridional heat exchange by surges in the Westerlies; ice sheets as reservoirs in global water circulation; variable expanses of sea ice and snow cover; distant linkages and their significance in climate models; reciprocal effects between ice and atmosphere; modeling global circulation with different ice covers.

I-29726

Royer, A., De Angelis, M., Petit, J.R., **Thirty-thousand-year record of physical and optical properties of microparticles from an East Antarctic ice core and implications for paleoclimate reconstruction models,** *Climatic change,* 1983 5(4), p.381-412, Refs. p.409-412.

Ice samples from the 905 m deep Dome C core (East Antarctica) were studied in terms of insoluble microparticle contents. Various techniques were used: right angle light scattering, nephelometer (multiangle light scattering), Coulter counter and microscope analyses, in order to make a thorough study of the physical and optical properties of microparticles and their variations over the last 30,000 years. Because of the possible effect of atmospheric turbidity on the earth-atmosphere radiation balance, optical parameters of climatic importance were estimated for insoluble microparticles. The detailed profile of total microparticle mass concentrations shows a drastic difference between high Last Glacial Maximum (LGM) and low Holocene concentrations. The optical scattering properties of 18,000 BP continental dust do not indicate a significant difference with respect to Holocene dust in terms of particle size distribution and complex refractive index. The possible warming of the atmosphere in these regions is estimated at 3 K per day and should therefore be taken into account in paleoclimate reconstruction models. (Auth. mod.)

I-29733

Ryzhakov, L.IU., Rabtsevich, S.V., **Principal types of atmospheric circulation pattern transformations in the Southern Hemisphere** [Osnovnye varianty preobrazovaniĭ form tsirkuliatsii atmosfery iuzhnogo polushariia], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.43-49, In Russian. 7 refs.

Statistical data on recurrence of transformations of different forms of atmospheric circulation in the Southern Hemisphere, gathered between the years 1965 and 1977 and showing seasonal variations, are presented.

I-29804

Parish, T.R., **Study of topographically forced surface winds in Antarctica with special emphasis on the katabatic flow at Adélie Land,** Madison, University of Wisconsin, 1980, 141p., University Microfilms order No.80-25842, Ph.D. thesis. Refs. p.128-131.

The most sensational feature of the climate of Antarctica is the katabatic winds found along the steeply-sloping coastal region. Of interest are the exceptional wind conditions along Adélie Land discovered approximately 70 years ago by an Australian expedition. The strength of the surface wind in this area is unsurpassed anywhere on earth. An attempt is made at explaining the extreme Adélie Land winds. Because the Adélie Land katabatic winds are so persistent, topography is thought to play a major role. Diagnosis of the winds inland of coastal Adélie Land show a strong confluence channel of radiatively-cooled air from the continental interior directed towards the coast. Topography acts to concentrate negatively-buoyant air into a narrow channel; it makes possible the extreme persistence of the katabatic flow at Adélie Land since the supply of cold air is nearly inexhaustible. Numerical models emphasizing effects of this topographic channelling and attendant huge cold air supply clearly show the confluence zone is a region of strong winds. It is concluded that the topographically forced convergence of air in the interior creates the large supply of cold air necessary for the strength and persistence of the Adélie Land katabatic winds. (Auth.)

I-29805

Douglass, A.R., **Model of the antarctic sink for stratospheric water vapor,** Ames, Iowa State University, 1980, 133p., University Microfilms order No.81-06007, Ph.D. thesis. Refs. p.104-107.

A model, based on temperatures derived from satellite-measured radiances and temperatures measured by radiosonde, has been developed to determine the maximum quantity of water vapor removed from the antarctic stratosphere for the winter of 1973. An analytic representation of the wind field, based upon several sources of information including geostrophic winds calculated from the satellite-derived temperature fields, balloon measured winds and the behavior of radiance waves in the polar region, has also been developed. The model results were found to be insensitive to the wind field parameters. For 1973, the sink strength is determined to be only about 1% of the total stratospheric water vapor burden. Annual variations in the sink magnitude are estimated for 1974 and 1975. The variations are found to be significant when years are compared to each other (35%-100%), but small compared to the total stratospheric mass of water vapor. These results are considered in the context of the annual stratospheric water vapor budget. (Auth.)

I-29813

Delmas, R., **Atmospheric carbon dioxide of the past** [Gaz carbonique atmosphérique du passé], *Recherche,* Sept. 1980 11(114), p.992-994, In French.

Studies of air trapped in antarctic ice for paleo-concentrations of carbon dioxide are reviewed. Methods of analysis are discussed which appear to provide evidence that the atmospheric CO2 content 15,000 y.a. was half that of today. The dangers of a global climatic change if this increase continues are pointed out.

I-29830

Streten, N.A., **Circulation contrasts in the southern hemisphere winters of 1972 and 1973,** *Australian meteorological magazine,* Sep. 1983 31(3), p.161-170, 14 refs.

Characteristics of the broadscale southern hemisphere circulation are examined for the winters of 1972 and 1973 when markedly diverse patterns of rainfall occurred over the southern continents. The principal significant contrasts occur in the latitude of the subtropical high pressure belt in particular regions and the longitudes of its pressure maxima, in the strength of the mid-latitude westerlies primarily at Pacific longitudes and in the sign and pattern of change of the Southern Oscillation Index. Lesser though distinct variation is evident in the characteristics of the Antarctic trough and the gross pattern of cyclonic distribution. The limited available data indicate contrasting sea surface temperature anomalies in the Australian sector. Sea ice data show only small variability between the two seasons but with contrasting late season anomalies in the Ross and Weddell sectors. (Auth.)

I-29831

Streten, N.A., **High latitude climates of the Pacific—past, present and future,** *Australian meteorological magazine,* Sep. 1983 31(3), p.185-197, 57 refs.

A brief review is given of the available historical record of instrumental observations at high latitudes of the Pacific, and selected examples are presented of proxy information sources particularly those for the late Quaternary over and bordering the high latitude ocean. The principal observed features of the present climate are described in terms of mean pressure, transient synoptic systems, wind, temperature, cloudiness, precipitation and sea-ice. Observed trends in the chemical composition of the global atmosphere are noted, and the characteristics of modelled climates at high latitudes resulting from extrapolated carbon dioxide trends are described. The limitations not only to knowledge of the past and the causes of interannual variability in the present climate but also to our ability to confidently predict future climates are emphasised. (Auth.)

I-29856

Olson, J.V., Wilson, C.R., Collier, J., McKibben, B.N., **Final progress report for Contract F49620-81-C-0091,** *U.S. Air Force Office of Scientific Research. Report,* Sept. 1982 AFOSR-TR-83-0130, 160p., ADA-126 391, 9 refs.

The morphology of microbarom infrasonic waves as observed in Antarctica is given for 1981 observations from Windless Bight. Application of pure-state filtering to infrasonic array data is described. Off-line frequency domain analysis software is presented for infrasonic wave analysis. (Auth.)

I-29861

Hogan, A.W., **Meteorological conditions accompanying a spectacular ice crystal optical display,** *American Meteorological Society. Bulletin,* Apr. 1984 65(4), p.367-370, 7 refs.

Ice crystal studies made at the South Pole in Jan. 1977 are described. Atmospheric conditions prevailing when the spectacular display formed are shown. The entire visual phenomenon was photographed using a fish-eye lens and many exposures. Limitations of this type of photography are noted and sketches are included to identify significant features. Conditions necessary to produce spectacular displays must be over the entire hemisphere of sky and all must be in proper balance: ice crystal type and orientation, in uniform layer and thickness without competing layers.

I-29909

McKenzie, R.L., Johnston, P.V., **Springtime stratosphere NO2 in Antarctica,** *Geophysical research letters,* Jan. 1984 11(1), p.73-75, 13 refs.

We present springtime measurements of column amounts of stratospheric nitrogen dioxide measured by ground based absorption spectroscopy from Scott Base. There is a rapid buildup from less than a quadrillion molecules/sq cm; at the end of August to about 15 quadrillion molecules/sq cm by mid October. The period covered is the transition time between winter night, and summer day; and in general the 'overnight' decay of NO2 is small. The decay is most significant at times when the duration of sunlight per day exceeds 12 hours. There are large day to day variations in column amounts which indicate that transport is a significant factor. (Auth.)

I-29934

Grosval'd, M.G., Shishorina, Zh.G., **Eleventh INQUA symposium on paleoclimatology and glacial history of the Southern Hemisphere** [Symposium XI kongressa INKVA po paleoklimatu i istorii oledeneniia iuzhnogo polushariia], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii. Khronika obsuzhdeniia,* Apr. 1983 Vol.47, p.44-47, In Russian.

At the 11th INQUA congress a special symposium was held on climatic and glaciation histories of the Southern Hemisphere. Seven papers presented formed two groups, depending on the evidence used: one had land surveying data, another was based on marine geology and stratigraphy, isotopic and micropaleontologic characteristics of deep bottom sediments of the southern ocean. Data from both groups, supplemented with materials on plate tectonics was used in the paper presented by Soviet scientists, titled *Development of the southern circumpolar current and glaciation of Antarctica.* Discussions included the history of Antarctic and Subantarctic islands, a critical review of glaciation of the islands surrounding the Scotia Sea. It is explained why the Falkland Islands underwent only the cirque type of glaciation, while islands to the south were entirely covered with ice caps, extending to their shelves. It was established, that the last glaciation of the islands was synchronous with that of the Antarctic shelf and North America's Wisconsin glaciation. Data discussed has shown, that at the present investigation level, the correlation of the glacial and climatic histories of the Southern Hemisphere can be only approximate and hypothetical.

I-30020

Lockwood, J.G., **Climate and ice sheets,** *Progress in physical geography,* Mar. 1982 6(1), p.101-107, 10 refs.

Topics reviewed concern the effect of continent distribution on climate during the Mid-Cretaceous, the age of the Antarctic Ice Sheet, possible cause of ice ages, and the ice-sheet/bedrock dynamics explanation for the sawtooth shape of the 100,000-yr glacial-interglacial cycle. (Auth.)

I-30022

Trenberth, K.E., **Interannual variability of the Southern Hemisphere circulation: representativeness of the year of the global weather experiment,** *Monthly weather review,* Jan. 1984 112(1), p.108-123., 37 refs.

Total variance fields of geopotential height, the north-south and east-west wind components and poleward transient eddy momentum fluxes at 500 mb are analyzed along with their contributions from two broad frequency bands covering 2-8 day and 8-64 day period fluctuations. Largest interannual variability occurs between 40-60 S in association with the main jet stream in summer or the polar jet stream in winter and the main belt of eddy activity within each season. The circulation and eddy statistics during the year of the Global Weather Experiment (GWE) are compared with the means and standard deviations over all years from 1972-80, and contrasted with individual years. The year of the GWE was characterized by an exceptionally deep circumpolar trough, an increase in westerlies between 45-70 S and a decrease to the north, with a southward shift in the main westerly jet during summer 1978-79 and a considerably enhanced and southward shifted polar jet but weaker subtropical jet in winter 1979. Associated with these changes was a southward shift in storm tracks and high frequency eddy activity throughout the year. (Auth. mod.)

I-30024

Prata, A.J., **Four-day wave,** *Journal of the atmospheric sciences,* Jan. 1984 41(1), p.150-155, 14 refs.

Further evidence is presented for a wavenumber 1 eastward traveling 4-day oscillation in the brightness temperatures of the polar winter stratosphere as measured by satellite. A wavenumber 2 eastward traveling 2-day oscillation is also observed, and appears to be phase locked to the 4-day wave. It is suggested that these oscillations are manifestations of a single propagating "warm pool" which obeys nonlinear dynamics. The analyses identifying the "warm pool" extend to about 70 S. (Auth. mod.)

I-30025

Loon, H. van, Rogers, J.C., **Interannual variations in the half-yearly cycle of pressure gradients and zonal wind at sea level on the Southern Hemisphere,** *Tellus,* Jan. 1984 36A(1), p.76-86, 13 refs.

Half-yearly oscillations in sea-level pressure gradients and zonal winds on the Southern Hemisphere are outlined by means of daily synoptic maps for several years. The pressure oscillation has amplitude peaks near 50 S and the Antarctic coast, separated by a minimum along 60 S where the phase changes from maxima in the extreme seasons in the south to maxima in the transitional season in the north. The zonal geostrophic wind consequently has a half-yearly wave with equinoctial maxima in the latitudes near 60 S, and one with solstitial maxima north of 50 S. The interannual variability of the half-yearly oscillations in the pressure gradients and winds is described and examples are given of the oscillations during FGGE and the IGY. (Auth.)

I-30032

Krenke, A.N., **Glaciers and climate** [Ledniki i klimat], *Zemlia i vselennaia,* Jan.-Feb. 1984 No.1, p.23-28, In Russian.

The various mechanisms of interaction between mountain glaciers or polar ice sheets and climate are reviewed for the nonspecialist and shown in diagrams. Climatic parameters such as precipitation, temperature, wind, etc. are considered. Various methods of studying past climate—isotope, gas and particle content of ice—are described.

I-30037

Hartman, D.L., Mechoso, C.R., Yamazaki, K., **Observations of wave-mean flow interaction in the Southern Hemisphere,** *Journal of the atmospheric sciences,* Feb. 1, 1984 41(3), p.351-362, 28 refs.

Variations of zonal mean and eddy properties in the Southern Hemisphere during the winter of 1979 are studied. Several periods of enhanced wave activity and rapid zonal-mean changes are observed. During these periods of rapid change both the actual zonal wind tendency and the Eliassen-Palm flux divergence have a dipole pattern in the upper stratosphere, with positive values in high latitudes and negative values in middle and low latitudes. The positive values of E-P flux divergence near the pole suggest a possible source of wave activity in this region. The stationary component of wavenumber 1 and the eastward traveling component of wavenumber 2 contribute most to the dipole pattern of wave driving in the stratosphere. The lower wavenumbers contribute most to the driving in high latitudes, while the driving in lower latitudes is contributed mostly by high wavenumbers. Wave forcing of the mean flow as measured by the

E-P flux divergence and actual changes in the mean flow are correlated with each other, but the actual mean flow tendencies are often significantly smaller than the eddy driving. The largest correlations between E-P flux divergence and the observed zonal mean wind changes exceed 0.5 and occur both in the upper stratosphere near the jet core and near the tropopause across a broad range of latitudes. (Auth.)

I-30038

Farman, J.C., Piggott, W.R., **Earth's atmosphere as seen from Antarctica,** *Impact of science on society,* July-Sep. 1982 32(3), p.281-290, 7 refs.

The accelerating activities in Southern Hemisphere climate research are reviewed. Differences in climate features between the Northern and Southern hemispheres, such as the "roaring fourties" and the "howling fifties" in the Southern Hemisphere, the low pressure in the southern temperate zone, the 1.6 degree difference in mean temperature between the two hemispheres, the different stratospheric circulations, and the different abrupt and minor heating spells are discussed. The study of ice cores as indicators of past climates is touched upon.

I-30046

Ohmae, H., **Surface meteorological data during oversnow traverse in 1982-1983,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.94, p.102-113.

Data from surface meteorological observations in the Shirase Glacier drainage basin, including air temperature, wind speed, wind direction, visibility, amount of cloudiness and weather, local standard time, station number and instrumentation used, are presented.

I-30054

Tolstikov, E.I., **Meteorological research in the Arctic and Antarctic during the Soviet years,** *Soviet meteorology and hydrology,* Nov. 1977 No.11, p.69-72, For Russian original see 32-2192, or 10I-19587.

This is an historical review of the meteorological research programs carried out by the Soviet Union since the Revolution. Included in the overview are international programs, such as POLEX, in which they have participated. Fundamental results are summarized, especially for recently completed work, and a brief outline of plans for the future is presented.

I-30069

Gillooly, J.F., Lutjeharms, J.R.E., **Ocean and climate: large-scale ocean-atmosphere interactions in the Southern Hemisphere,** *South African journal of science,* Jan. 1984 80(1), p.36-40, 35 refs.

Various research programs originating in the world-wide interest in climate, and pertinent literature, are reviewed. Ocean and atmosphere interaction, particularly in the Southern Hemisphere, are discussed, and the major physical components and feedback processes responsible for the maintenance of climate are illustrated.

I-30079

Sansom, J., **Temperature record of Scott Base, Antarctica,** *New Zealand journal of science,* 1984 27(1), p.21-31, 8 refs.

The temperature record of Scott Base for the period 1958-1982 is shown as time series in which no significant overall warming or cooling trend appears. The distribution of the temperatures fits a bimodal model with nearly equal-sized normal modes at about 1 C either side of the overall mean. The average time that the temperature fluctuates about a particular mode is approximately 2 years, and the frequency of change of mode follows Poisson's distribution with changes taking place within a month or two. This bimodal behavior appears to be fairly local to Scott Base and can be used to explain an apparent warming trend. (Auth.)

I-30081

Gubanova, S.I., Mashkovich, S.A., **Evaluating the informativeness of an aerological-and-satellite measurement system,** *Soviet meteorology and hydrology,* 1977 No.12, p.6-9, 6 refs. For Russian original see 10I-20515.

An attempt is made to compute the accuracy of time-space optimal interpolation factor in satellite aerological systems. Data on the accuracy of such analysis are given for each hemisphere separately.

I-30082

Koshel'kov, IU.P., Butko, A.I., **Seasonal variations in atmospheric temperature in the Southern hemisphere at heights of 25-80 km,** *Soviet meteorology and hydrology,* 1980 No.4, p.6-9, 23 refs. For Russian original see 11I-23457.

From mean monthly southern hemisphere temperature readings at 25-80 km heights and from the equator to Molodezhnaya Station, amplitudes and phases of annual and semiannual oscillations are calculated. The comparison is made with northern hemisphere data, and large interhemispheric differences are found in the nature of seasonal variations. These differences confirm the necessity for creating reference atmospheric models for each hemisphere separately. (Auth.)

I-30085

Jouzel, J., Merlivat, L., Lorius, C., Pourchet, M., **30000 yr. climatic record. Main results deduced from oxygen 18 and deuterium profiles from the Dome C ice core (Antarctica),** Symposium on variations in the global water budget, Oxford, U.K., Aug. 10, 1981. Conference proceedings, [1981], 1p. DE82 702351, CEA-CONF-5877.

A continuous oxygen 18 profile measured along a 906 m ice core drilled at Dome C in East Antarctica yielded an isotopic climatic record spanning about the last 30,000 years. The lower d value observed for the last and coldest part of the ice age reflects a higher relative humidity in the oceanic area providing the moisture for antarctic precipitation.

I-30104

Keeling, C.D., **Atmospheric and oceanographic measurement needed for establishment of data base,** Potential effects of carbon dioxide-induced climatic changes in Alaska; The proceedings of a conference. Edited by J.H. McBeath, Fairbanks, University of Alaska, Mar. 1984, p.11-22, 13 refs.

Measurements of atmospheric CO2 going back to the 1950s are reviewed and man's part in the increase, especially in the Northern Hemsiphere, through the burning of fossil fuels is discussed. A need is seen for additional measuring stations to supplement (or in some cases to replace) those at South Pole, Baring Head, N.Z., Mauna Loa, La Jolla, Calif., Weathership P, and Barrow. Diagrams show the patterns of atmospheric CO2 increases from these stations plus Christmas and Fanning Islands, Cape Kumukahi, and the 1980 FGGE stations.

I-30105

Weller, G., **Sea ice, carbon dioxide, and climate,** Potential effects of carbon dioxide-induced climatic changes in Alaska; The proceedings of a conference. Edited by J.H. McBeath, Fairbanks, University of Alaska, Mar. 1984, p.199-208, 44 refs.

Numerical modeling experiments have indicated that atmospheric warming due to an increased carbon dioxide content of the atmosphere will be highest in the polar regions. Sea ice, which responds to temperature variations by advancing or retreating, may therefore be a sensitive indicator of such a climatic change. The present paper examines the physical properties and processes of Antarctic sea ice and their probable relation to climatic change. These processes are complicated by various feedback mechanisms, and the carbon dioxide effects are difficult to quantify against a noisy background of climate-related processes and variations. The sea-ice zone of the Antarctic is also an important global sink for carbon dioxide, due to the intensive vertical exchange processes which occur there. It is suggested that monitoring of sea-ice extent may provide an early sign of carbon dioxide-induced climate change. (Auth.)

I-30124

Yamanouchi, T., Iwashina, I., Seo, Y., **Derivation of total ozone amount in the antarctic atmosphere from TOVS of TIROS-N/NOAA satellites,** *Antarctic record,* March 1984 No.81, p.9-15, In English with Japanese summary. 11 refs.

A simple regression method is applied to derive the total ozone amount from the TOVS data of TIROS-N/NOAA meteorological satellites received at Showa Station, Antarctica. Besides channel 9 located in the ozone 9.6 micron band, channels 1, 2, 3 and 8 of HIRS/2 are used. Regression coefficients are determined against Dobson measurements at Showa Station. Data from 50 orbits of NOAA-6 and -7 are analyzed for 1981-1982. RMS errors of retrieved ozone amounts are 3 to 13 DU at Showa Station. Horizontal distributions of the total ozone amount are also given and fairly good agreements are seen at the South Pole between the ozone amounts derived from satellites and ground Dobson measurements. (Auth.)

I-30125

Ueno, T., Matsubara, K., Sakamoto, T., Matsuhara, K., **Meteorological observations at Syowa Station in 1980 by the 21st Japanese Antarctic Research Expedition,** *Antarctic record,* March 1984 No.81, p.16-37, In Japanese with English summary. 8 refs.

This paper describes the results of meteorological observations (mainly surface and aerological) at Showa Station from February 1, 1980 to January 31, 1981. The new processing system for the weather data (AMOS: Automated Meteorological Observation System) was set up in January 1980, and automated upper-air observations by means of this system began in February 1980. Remarkable characteristics are as follows: 1) The temperature remained high through the year. The mean temperature of 1980 was 2.2 C higher than the normal, which was the highest value since our observation had started. 2) Sea ice around Ongul Islands flowed away due to the heavy blizzard which hit on March 17-18, 1980. This phenomenon was the first experience since Showa Station had been established. (Auth.)

I-30153

Burns, G., **Variation of Southern Hemisphere atmospheric vorticity around interplanetary magnetic field sector crossings,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1983 No.14, 27p., 16 refs.

The variation of a Southern Hemisphere absolute vorticity area index about solar sector boundary crossings is examined by the superposed epoch method. It is concluded that the Southern Hemisphere results do not confirm the winter decrease in vorticity near sector crossings found by researchers using Northern Hemisphere data. There is, however, limited indication that the following Southern Hemisphere effects may exist: (a) A vorticity decrease in the summer months showing a shape similarity to the Northern Hemisphere winter response. (b) A winter peak in vorticity on the boundary crossing date for the Australian quadrant of the Southern Hemisphere. (Auth.)

I-30175

Ito, T., **Study on properties and origins of aerosol particles in the antarctic atmosphere,** *Papers in meteorology and geophysics,* Sept. 1983 34(3), p.151-219, In Japanese with English summary. Refs. p.216-219.

Seasonal variations of concentration, size and distribution of aerosol particles were studied at Showa Station with the following conclusions: particles smaller than 0.01 micron in radius are secondary particles which are produced through photochemical processes within the antarctic troposhere and which determine the properties of antarctic aerosols; in the consideration of the mechanism of global air pollution by aerosols more attention must be paid to the transport of relatively inert precursor gases and the subsequent generation of secondary particles than to a mere wide diffusion of polluting particles.

I-30184

Barry, R.G., ed, **Workshop on antarctic climate data,** *Glaciological data,* Apr. 1984 No.15, 69p., Refs. p.24-28.

Deliberations of workshop participants examining the current status and suggested improvements of climatic data reporting are summarized. The areas covered are synoptic meteorology, climatology (standard and non-standard expedition-type reports), oceanography, glaciology, and satellite remote sensing. Tables listing existing data transfer and archival mechanisms are appended.

I-30185

Schwerdtfeger, W., **Weather and climate of the Antarctic,** Developments in Atmospheric Science, 15, Amsterdam, Elsevier, 1984, 261p., Refs. p.242-257.

This book presents an up to date description and explanation of the meteorological characteristics of Antarctica, including their close relation to the ice conditions on the surrounding water. Individual chapters cover radiation and surface temperature, the winds atmospheric circulation and its disturbances, and water as gas, liquid and solid. Climatological problems that need further field work and theoretical investigation are outlined in detail. Five appendices with tables listing antarctic weather stations and showing meteorological data gathered over the years, are included, as is an extensive bibliography.

I-30189

Adamson, D.A., Pickard, J., Bird, G.A., Foley, C., **Audible wind-generated shock waves in Antarctica,** *Polar record,* May 1984 22(137), p.186-189, 2 refs.

Loud, repeated noises which do not seem to be caused by rock or ice movements are reported in the North Masson Range area. Booms are always associated with violently gusting winds of more than 50 m per second which, in turn, are associated with low pressure systems. A two-dimensional model, to predict wind gusts generating audible acoustic waves, that can be applied to the antarctic situation, is discussed.

I-30209

Dolgin, M.I., **Temperature effects on longwave radiation fluxes in the antarctic atmosphere** [O vliianii temperatury na formirovanie potokov dlinnovolnovoĭ radiatsii v atmosfere Antarktidy], *Problemy Arktiki i Antarktiki; sbornik stateĭ,* 1984 Vol.58, p.72-76, In Russian. 4 refs.

Data collected from atmospheric soundings at Molodezhnaya Station under winter clear-sky conditions show a definite relationship between the air temperature at different levels and the fluxes of longwave radiation in the atmosphere. Correlation coefficients are tabulated; graphs showing the relationship, as well as the vertical profiles of different atmospheric parameters, are included.

I-30265

Fraser, G.J., **Summer circulation in the antarctic middle atmosphere,** *Journal of atmospheric and terrestrial physics,* Feb. 1984 46(2), p.143-146, 7 refs.

In November 1982 a partial reflection drifts system for the measurement of winds in the mesosphere and lower thermosphere was installed as part of the New Zealand Antarctic Research Programme at Scott Base. The wind speed and direction are measured once an hour from echoes available at the time within a height range of 67-97 km. Initial observations, made during December 1982, show westward winds between 70 and 90 km, reaching a broad maximum of about 25 m/s around 85 km. There is a strong (10 m/s) meridional component away from the pole at heights of 85-95 km. (Auth.)

I-30280

Hansen, J.E., ed, Takahashi, T., ed, **Climate processes and climate sensitivity,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, Maurice Ewing series, Vol.5. Maurice Ewing Symposium, 4th, Palisades, NY, 1982, 368p., Refs. passim. For selected papers see 38-4246 through 38-4255 or I-30281 through I-30287.

This monograph discusses climatic processes and climatic sensitivity using observational data in the northern and southern hemispheres. The book is organized into conventional areas, such as the atmosphere, ocean and cryosphere, which are bound together by the feedback processes.

I-30281

Bentley, C.R., **Some aspects of the cryosphere and its role in climatic change,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.207-220, Refs. p.218-220.

The ice cover of the earth plays a direct and important role in climate and climatic change. Sea ice responds rapidly and sensitively, and is important because of effects on albedo, heat exchange between ocean and atmosphere, and oceanic mixing. Glaciers (including ice sheets) interact on a longer time scale, but some mechanisms for significant changes on a human time scale do exist. The possibility of rapid disappearance of the West Antarctic ice sheet with a consequent 5-m rise in sea level has received much attention. There is some evidence that the extent of the Antarctic sea ice cover had diminished in the last few decades. Evidence related to the ice sheets is ambiguous—the measured rise in sea level suggests slow melting of the ice sheets, but field glaciological measurements, incomplete though they are, indicate just the opposite. Whatever the effect of climatic warming on the marine West Antarctic ice sheet, it appears to be physically impossible for it to go afloat in as little as 200 years; a more reasonable estimate of the minimum time needed is 500 years. (Auth.)

I-30282

Barry, R.G., Henderson-Sellers, A., Shine, K.P., **Climate sensitivity and the marginal cryosphere,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.221-237, Refs. p.235-237.

There is a significant dearth of information on high-latitude cloudiness and the surface properties of the seasonal cryosphere, and on the degree of association between them. Following a survey of available data, some new observational material is presented on cloud conditions in the vicinity of snow cover and sea ice margins, using both 3-D Nephanalysis data and DMSP imagery. 1-D radiative calculations are used to illustrate the urgent need for improved observational data on cloud cover and surface albedo. The presence of cloud cover strongly damps the net effect on planetary albedo of any perturbation in snow/ice extent; an effect which is neglected in simple treatments of the ice-albedo feedback mechanism. The general problem of the appropriate parameterization of high-latitude surface albedo and cloud regimes in GCMs is discussed in the context of the review of observational data. Results from the new GISS GCM illustrate some important problems to be overcome in all climate models. (Auth.)

I-30283

Hibler, W.D., III, **Role of sea ice dynamics in modeling CO2 increases,** *American Geophysical Union. Geophysical monograph,* MP 1749, 1984 No.29, p.238-253, 21 refs.

Sensitivity simulations of a hierarchy of Antarctic sea ice models to atmospheric warming are carried out and analyzed. The study includes models with only a thermodynamic ice cover, models with *in-situ* leads but no ice transport, and a fully coupled dynamic/thermodynamic model that includes transport, leads and strength-thickness coupling. All models employ a 60-m-thick oceanic mixed layer, together with a spatially and temporally varying heat flux into the mixed layer from the deep ocean. The heat flux was generated interactively by using a fixed fraction of the ice growth and cooling rates from the full dynamic/thermodynamic model. The same spatially and temporally varying heat flux fields were used in all sensitivity simulations. Models including full ice dynamics effects are found to be less sensitive to atmospheric warming than thermodynamics-only models, while models with specified lead fractions are more sensitive than thermodynamics-only models. (Auth. mod.)

I-30284

Parkinson, C.L., Bindschadler, R.A., **Response of Antarctic sea ice to uniform atmospheric temperature increases,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.254-264, 31 refs.

The effect on Antarctic sea ice of hypothetical atmospheric temperature increases is simulated using a thermodynamic/dynamic sea-ice model. The results show noticeable regional differences in the response of the ice cover, with a hemispherically-averaged winter ice-edge retreat rate of 1.4 degrees of latitude for each 1 K increase in atmospheric temperatures. These retreat rates are non-linear with respect to temperature change, the sensitivity of the position of the ice edge decreasing as temperatures are further increased. This nonlinearity in the response of the ice edge occurs in the response of other ice variables as well, including the total ice area and total ice volume at maximum ice extent. By comparison, for the peak summer period, a 3 K temperature increase suffices to eliminate all ice except in the Amundsen and western Weddell Seas. (Auth. mod.)

I-30285

Thomas, R.H., **Ice sheet margins and ice shelves,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.265-274, 29 refs.

A possible consequence of climatic warming is an increase in ice sheet melting rates and, ultimately, a perceptible rise in sea level. This would occur very slowly unless thinning at the ice sheet margins triggered a major increase in ice drainage rates. The ice sheet in West Antarctica is the one most susceptible to this type of collapse because it rests on bedrock well below sea level. The most probable outlet for rapid ice discharge would be through the area covered today by the Ross Ice Shelf, which would have to be severely weakened first. The most vulnerable portion of the ice sheet is probably that drained by Pine Island and Thwaites glaciers in West Antarctica. These glaciers are not protected by large ice shelves and, although there is no evidence for present day retreat, they may be the first glaciers to respond to climatic warming. However, even an order of magnitude increase in the activity of one of these glaciers would cause a sea level increase of less than 1 mm/yr. (Auth. mod.)

I-30286

Fastook, J.L., **West Antarctica, the sea-level controlled marine instability: past and future,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.275-287, 21 refs.

A world-wide coupled hydrosphere model, triggered by ablation-controlled terrestrial retreat along the landward margin of the northern hemisphere ice sheets, and amplified by the sea-level controlled marine instability, produces a sea-level curve which compares well with an oxygen isotope sea-level curve. Collapse of Antarctica from its maximum extent 18,000 years ago to a configuration similar to its present state is modelled. Implications for further retreat of West Antarctica following the removal of buttressing ice shelf in the Amundsen Sea are also shown. Modelling results suggest that the Amundsen Sea sector including Pine Island Bay can only be stabilized at its present position in the presence of a buttressing ice shelf. (Auth. mod.)

I-30287

Mercer, J.H., **Simultaneous climatic change in both hemispheres and similar bipolar interglacial warming: evidence and implications,** *American Geophysical Union. Geophysical monograph,* 1984 No.29, p.307-313, Refs. p.311-313.

Simultaneity in the Northern and Southern hemispheres of the last interglacial 125,000 BP, and last glacial maxima 20,000 and 14,-500 BP, and the following abrupt and rapid warming 14-11,000 BP, so far defies satisfactory explanation. Ability to forecast the relative magnitude of future CO2-induced climatic warming in the Northern and Southern hemispheres is needed in order to foretell the response of the cryosphere; climatic models give contrasting prognostications. Inconclusive evidence for deglaciation of West Antarctica during the last interglacial suggests that the Antarctic area then warmed by as much as did the Arctic. In many ways the last interglacial was probably an analogue of a future CO2-induced warm interval; proof or disproof of the suspected exceptional level of last interglacial warmth in Antarctica is needed in order to estimate the sensitivity of the global climate system to CO2 input. (Auth.)

I-30311

McCormick, M.P., **SAM II measurements of the polar stratospheric aerosol Volume I, Oct. 1978-April 1979,** *U.S. National Aeronautics and Space Administration. Reference publication,* Dec. 1981 NASA RP-1081, 71p., N82-13592, 6 refs.

DLC QC882.M43 1981 Vol.1

The Stratospheric Aerosol Measurement (SAM) II sensor aboard Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosol has a vertical resolution of 1 km. This report presents representative examples and weekly averages of these aerosol data as well as corresponding temperature profiles for the time and place of each SAM II measurement during the first 6 months of satellite flight. From the aerosol extinction-profile data, contours of aerosol extinction as a function of altitude and longitude or time are plotted. Also, aerosol optical depths are calculated for each week. Seasonal variations and variations in space for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 micron for this time period are .001 to .003/km in the main stratospheric aerosol layer. Optical depths for the stratosphere are about 0.002. Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter at various times and locations. (Auth. mod.)

I-30316

Parish, T.R., **Numerical study of strong katabatic winds over Antarctica,** *Monthly weather review,* Mar. 1984 112(3), p.545-554, 22 refs.

Certain coastal sections of Antarctica, most notably Adelie Land and Terra Nova Bay, experience anomalously intense, persistent katabatic winds. The forcing of such katabatic outflow is believed to originate several hundred kilometers upslope in the interior of the continent where cold air drainage currents from a large area converge into a relatively narrow zone focused on the steeply-sloping ice terrain near the coastline. Numerical simulations with a three-dimensional hydrostatic model incorporating terrain features representative of Adelie Land reveal a significant topographic channeling of the surface airflow. Katabatic wind speeds as depicted by the model are greatly enhanced downslope of the convergence channel. These results emphasize the importance of topography in the continental interior in shaping the character of coastal katabatic flow. (Auth.)

I-30318

McPeters, R.D., Heath, D.F., Bhartia, P.K., **Average ozone profiles for 1979 from the NIMBUS 7 SBUV instrument,** *Journal of geophysical research,* June 30, 1984 89(D4), p.5199-5214, 10 refs.

Monthly average ozone profiles from the first year of operation of the solar backscattered ultraviolet (SBUV) instrument on the NIMBUS 7 satellite (November 1978 through October 1979) are tabulated for 10 deg latitude bands from 80 S to 80 N. For each month and latitude zone we list layer ozone amounts and standard deviations for 12 Umkehr layers (approximately 0-60 km) and the average total ozone for each zone. The ozone mixing ratio and number density at the center of each layer are also given. The average SBUV profiles agree with average Umkehr profiles measured at Boulder to within 10% over most of the range. The Krueger-Minizner model is a good representative ozone model for 45 N, agreeing with an annual average of our measured profiles to better than 10% between 20 and 60 km. (Auth.)

I-30325

National Research Council. Polar Research Board. Committee on the Role of Polar Regions in Climatic Change, **Polar regions and climatic change,** Washington, D.C., National Academy Press, 1984, 59p., Bibliography p.54-58.

The report presents an overview of the current state of knowledge and research in polar regions and examines the roles of ice and snow as two major factors in global climate changes. Recommendations are made in a broad area of polar regions research and the technology needed to continue research and improve capabilities. Discussions of specific topics include, among others: energy transfer processes; effects on global climate changes; sea ice; snow cover and ice sheets relationships with climate; isotope chronology; pollen in tundra and boreal zones; tree rings; responses of glaciers and ice sheets; past changes current status, and trends in climate, sea ice, and ice sheets.

I-30327

Raschke, E., D'Aguanno, J., **Clouds over antarctic ice and snow fields,** *Contributions to atmospheric physics,* Feb. 1983 56(1), p.147-151, In English with German figure captions. Comments by J. D'Aguanno Ibid.,.57(2):285-286, May 1984. 3 refs.

Some of the problems of reflected radiation in polar regions are recognized in the process of interpreting satellite images of clouds, snow, and ice covers. Various causes of the reflected radiation are discussed and specific examples with images are cited. D'Aguanno comments on Raschke's interpretations.

I-30334

Lambert, G., Ardouin, B., Mesbah-Bendezu, A., **Atmosphere to snow transfers in Antarctica,** International Conference on Precipitation Scavenging, Dry Deposition, and Resuspension, 4th, Santa Monica, 1982, Vol.2, New York, Elsevier, 1983, p.1289-1300, Includes discussion. 18 refs.

An attempt is made to determine the washout factor of radioactive aerosols by antarctic snow over one or several years. The study is limited to SR-90 and PB-210, distinguishing as far as possible, wet and dry fallout. Cores were taken at several antarctic locations, packed, and shipped to a laboratory for processing. Measurements were also made of both nuclides present in the antarctic atmosphere and at various other locations throughout the Southern Hemisphere. Analytical methods are described and results are discussed.

I-30351

Yamanouchi, T., **Variations of incident solar flux and snow albedo on the solar zenith angle and cloud cover, at Mizuho Station, Antarctica,** *Meteorological Society of Japan. Journal,* Dec. 1983 61(6), p.879-893, In English with Japanese summary. 43 refs.

The global radiation at Mizuho Station was large compared to that at a normal mid-latitude station. The atmospheric transmittance was high, averaging about 0.75 to 0.80 in summer because of the small amount of atmospheric molecules, aerosols, and water vapor. Diffuse radiation from a clear sky was about twice as large as that for the place of 0% albedo owing to the high surface albedo through the multiple reflection between the snow surface and atmospheric layer. The effect of clouds on reduction of global radiation was small also on account of the multiple reflection, especially in the visible spectral region. The effect of drifting snow was also examined. The cloudy sky albedo was higher than the clear sky albedo because of the variation of spectral distribution of the incident solar flux. The solar zenith angle dependence of the albedo varied as the micro and macroscale snow surface conditions; however, generally the albedo increased as the solar elevation decreased. Measured albedo was compared to the theoretical albedo calculated from a radiative transfer model, and good agreement was found on the average. (Auth. Mod.)

I-30352

Andreas, E.L., **Reports of the U.S.-U.S.S.R. Weddell Polynya Expedition, October-November 1981, Volume 6: Upper-air data,** *U.S. Army Cold Regions Research and Engineering Laboratory,* SR 83-13, May 1983 288p. ADA-134 871.

This report summarizes the most extensive set of upper-air data ever collected over Antarctic sea ice in winter, the data obtained using radiosondes during the U.S.-U.S.S.R. Weddell Polynya Expedition. The report includes a description of the two radiosonde systems used, a chronological listing of all 110 soundings made during the expedition, a discussion of measured and derived quantities, listings of all of the sounding data, and plots to 5 km of the potential temperature profile from each sounding.

I-30382

Bromwich, D.H., Kurtz, D.D., **Katabatic wind forcing of the Terra Nova Bay polynya,** *Journal of geophysical research,* May 20, 1984 89(C3), p.3561-3572, Refs. p.3570-3572.

It is proposed that the Terra Nova Bay polynya is formed and maintained through the combined influence of persistent katabatic winds, which advect bay ice eastward and prevent it from consolidating in the polynya, and the blocking action of the Drygalski Ice Tongue, which prohibits northward drifting pack ice from entering the bay. A review of available studies shows a confluence of surface air on the plateau west of Terra Nova Bay; descent of this air to sea level, as katabatic winds which drain principally through the Reeves Glacier valley; stability of katabatic outflow seaward of the coastal slope break, for distances comparable to observed polynya width; that bay waters maintain a high sea surface heat flux and that wind-generated wave and current activity prevents sea ice from consolidating; blocking action of the Drygalski Ice Tongue; and that the above recur each year.

I-30385

Frederiksen, J.S., **Onset of blocking and cyclogenesis in Southern Hemisphere synoptic flows: linear theory,** *Journal of the atmospheric sciences,* Apr. 1, 1984 41(7), p.1116-1131, 32 refs.

A study is made of the instability properties of two instantaneous Southern Hemisphere synoptic flow fields. The growth rates, phase frequencies, perturbation streamfunctions and, for some modes, eddy heat and momentum fluxes of growing disturbances are obtained using a linear, spherical, five-level, quasi-geostrophic model. Both the zonally averaged and three-dimensional flow fields are studied and the eigenmodes are compared with the observed regions of the onset of blocking and of developing midlatitude cyclones. The two principal latitude bands of development are picked out by the instability solutions for the zonally averaged basic flows. For the three-dimensional basic states, the linear solutions reproduce the geographical locations of some of the principal regions of the onset of blocking and cyclogenesis reasonably well. Antarctic data are used in the analyses and modelling processes. (Auth.)

I-30412

Japanese Antarctic Research Expedition, **Meteorological data at the Syowa Station in 1982,** Antarctic Meteorological Data Vol.23, Tokyo, Japan Meteorological Agency, 1984, 260p.

In tabular form a very detailed presentation is given of the state of the atmosphere over Showa in 1982. Standard meteorological symbology and parameters are used throughout. Section 1 contains monthly and daily summaries of surface weather conditions and all synoptic data for the year. Section 2 provides monthly summaries of aerological data and full upper air observations. Section 3 gives global solar radiation measurements in monthly summaries and hourly observations. Section 4 presents atmospheric turbidity data showing daily, monthly, and extreme conditions.

I-30413

Garcia, R.R., Solomon, S., Roble, R.G., Rusch, D., **Numerical response of the middle atmosphere to the 11-year solar cycle,** *Planetary and space science,* April 1984 32(4), p.411-423, Refs. p.422-423.

A two-dimensional numerical model with coupled photochemistry and dynamics has been used to investigate the response of the middle atmosphere (16-116 km) to changes in solar activity over the 11-year solar cycle. Model inputs that vary with solar cycle include solar radiation, cosmic ray and auroral ionization rates and the flux of NOx at the model's upper boundary. In this study, the results of model runs for solar cycle minimum and maximum conditions are compared. Very large abundances of NOx are produced above 90 km by auroral particle precipitation. Considerable amounts of NOx are transported subsequently to the stratosphere by the global mean meridional circulation. It is shown that this excess NOx can lead to significant decreases in ozone concentrations at high latitudes and that it may explain observations of nitrate deposition in Antarctic snow. (Auth.)

I-30417

Baker-Blocker, A., DeLuisi, J.J., Dutton, E., **Received ultraviolet radiation at the South Pole,** *Solar energy,* 1984 32(5), p.659-662, 5 refs.

Received ultraviolet radiation (UV) is an important but small component of total global radiation. This study focuses on received UV at the Amundsen-Scott Station at 90 S during the austral summers of 1978-79, 1979-80 and 1980-81, with emphasis on clear-sky periods. Measurements of received UV were made with an Eppley UV pyranometer, while nonspectral global radiation was measured using an Eppley pyranometer with quartz filter. From this study, it appears that received UV at the South Pole during clear sky periods has a remarkably uniform annual cycle. The midsummer peak average hourly value observed is 2.10 mW/sq cm, for a peak possible 24-hour value of around 50 mW/sq cm. (Auth.)

I-30428

Pearman, G.I., Beardsmore, D.J., **Atmospheric carbon dioxide measurements in the Australian region: ten years of aircraft data,** *Tellus,* Feb. 1984 36B(1), p.1-24, Refs. p.23-24.

Observations of the atmospheric carbon dioxide (CO2) concentration made during the period 1972 through 1981 are presented. The data are based on air samples collected from aircraft throughout the troposphere and lower stratosphere over the Australian-New Zealand region and as far south as Antarctica. A description is given of the degree of natural variability of CO2 concentration at all levels of the troposphere and lower stratosphere. The average rate of concentration increase in the mid troposphere over the period represented by the data is 1.3 ppmv/y, varying considerably with time. These variations agree with similar variations, also tabulated, observed at the South Pole. The mid-tropospheric data indicate a fossil fuel airborne fraction over the period January 1973 to January 1981 of 0.57. The annual variation of the CO2 concentration in the mid-troposphere is discussed. (Auth. mod.)

I-30429

Warburton, J.A., **Chemistry of precipitation in relation to precipitation type,** *Science of the total environment,* April 1982 Vol.23, p.379-386, 9 refs.

Collections have been made of several types of wet deposition and of aerosols in various particle size ranges. The chemical composition of the precipitation changes significantly from one precipitation type to another. The forms of deposition appear to be important factors controlling the concentrations and ratios of the elements which have been measured. The aerosol samples show significant changes in chemical composition with particle size, consistent with other observers' results. It is hypothesized that these changes in aerosol chemistry and those of the wet deposition are related, and that this information, combined with the theoretically supported processes of nucleation, Brownian capture, phoretic processes and impaction, provide a better insight to the physical processes involved in the removal of chemical impurities from the atmosphere. Samples examined in this study were taken from the Ross Ice Shelf. (Auth.)

I-30436

Poggi, A., **Interaction of atmosphere, ice, and ocean in Antarctica** [Interaction atmosphère, glace, océan en Antarctique], *Météorologie,* June-Sept. 1982 No.29-30, p.163-172, In French. 18 refs.

Data on the cooling effects of surface winds on antarctic coastal regions are presented, based on studies carried out in a IAGO program from unmanned weather stations and flights of Hercules LC 130 of the National Science Foundation. Katabatic wind measurements—pressure, velocity, direction, temperature, and humidity—and measurements of degree of ground inclination are discussed and the profiles obtained are illustrated.

I-30449

Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung, **Isotopes in antarctic research—contributions of the GDR II,** ZFI-Mitteilungen, No.89, Leipzig, 1984, 132p., For individual papers see 39-126 through 39-129, or B-30456, E-30451, E-30453, E-30454, E-30457, F-30450, I-30452, and I-30455.

Most of the samples collected and studied derived from the Schirmacher Ponds region and the Wohlthat Massif in Dronning Maud Land. The eight papers in this collection treat isotopic materials found in precipitation, lake waters, water vapor, bird breeding places, and basalt dykes.

I-30452

Kowski, P., **Investigation of deuterium concentration relations between atmospheric water vapor and precipitation in the Schirmacher Oasis, East Antarctica,** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.31-45, 3 refs.

At Novolazarevskaya samples of precipitation and air moisture were collected from 1978 to 1981. The *delta*D values of those samples were measured and the correlation with temperature is presented. A comparison of *delta*D values of precipitation and air moisture samples provides information both about processes of condensation and the origin of precipitation. The measured results suggest that precipitation collected at Novolazarevskaya Station did form from atmospheric moisture sampled here. The precipitation is assumed to be condensed in the region east of the Wohlthat Massif and transported to the Schirmacher Oasis. (Auth.)

I-30455

Hermichen, W.-D., Kowski, P., Strauch, G., **Isotope-glaciological situation in the surroundings of the Schirmacher Oasis/Dronning Maud Land—a first overview,** *Akademie der Wissenschaften der DDR. Zentralinstitut für Isotopen- und Strahlenforschung. ZFI-Mitteilungen,* May 1984 No.89, p.87-102, 15 refs.

Isotope studies of shelf and inland ice in the surroundings of the Schirmacher Oasis show that both the basal zone of the ice shelf and a base layer of inland ice with a thickness of several tens of metres, represent relics of the thick Late Pleistocene ice cap of Dronning Maud Land. The thicker upper part of the inland ice sheet is, up to the foreland of the Wohlthat Massif, composed of post-Pleistocene local precipitation. The isotope-stratigraphic division of the Novolazarevskaya Ice Shelf shows an approximately 200 m thick layer between the Pleistocene base and younger local firn-ice formations which is formed by the recent outflow of the Wegener Inland Ice. (Auth.)

I-30481

Lorius, C., Raynaud, D., Petit, J.R., Jouzel, J., Merlivat, L., **Late-glacial maximum-Holocene atmospheric and ice-thickness changes from Antarctic ice-core studies,** *Annals of glaciology,* 1984 Vol.5, p.88-94, Refs. p.93-94.

A review of Byrd, Vostok and Dome C Antarctic ice-core records indicates significant changes in atmospheric characteristics between the late glacial maximum (LGM) and the Holocene. This data is relevant to general circulation model (GCM) boundary conditions and validation of output results. Reciprocally, GCM data could help to interpret ice-core results and to extend observed high-latitude changes to a larger scale. During the LGM, low troposphere temperatures were colder by about 5 to 7 C and surface temperatures by 8 to 10 C over the Antarctic ice sheet. There are indications that snow accumulation was slightly lower and isotopic data suggests higher relative humidity over the ocean. A large increase in continental dust (up to a factor of 20) and marine aerosols (up to a factor of 5) is observed on the high antarctic plateau, both explained by the increased intensity of the large-scale atmospheric circulation modulated by desert and sea-ice area extension. Ice-core results show large changes in atmospheric CO2 concentrations with LGM values around 200 ppmv and "pre-industrial" values of about 260 ppmv. Finally, determinations of total gas content suggest that central West and East Antarctica were not thicker during the LGM in contrast with higher surface elevations inferred from coastal-ice studies. (Auth.)

I-30501

Roble, R.G., Kasting, J.F., **Zonally averaged circulation, temperature, and compositional structure of the lower thermosphere and variations with geomagnetic activity,** *Journal of geophysical research,* Mar. 1, 1984 89(A3), p.1711-1724, 91 refs.

A zonally averaged chemical-dynamical model of the thermosphere is used to examine the effect of high-latitude particle and Joule heating on the neutral composition, temperature, and winds at solstice for solar minimum conditions. The meridional circulation forced by solar heating alone is a summer-to-winter flow, with a winter enhancement in atomic oxygen. The high-latitude heat sources drive mean circulation cells that reinforce the solar-drive circulation in the summer hemisphere and oppose this circulation in the winter hemisphere. The changes in wind and temperature caused by the high-latitude heat sources increase the relative concentration of N2 and O2 in the high-latitude upper thermosphere and decrease the O concentration in the high-latitude lower thermosphere. For prolonged moderate levels of geomagnetic activity the peak atomic oxygen density in the polar regions can decrease by factors of 2-3 from geomagnetic quiet conditions. (Auth.)

I-30502

Gérard, J.C., Roble, R.G., Rusch, D.W., Stewart, A.I., **Global distribution of thermospheric odd nitrogen for solstice conditions during solar cycle minimum,** *Journal of geophysical research,* Mar. 1, 1984 89(A3), p.1725-1738, 87 refs.

A two-dimensional model of the minor neutral constituents N(D-2), N(S-4), and NO from 70 to 360 km is formulated and used to investigate the global distributions of these species for December solstice conditions during solar cycle minimum. Transport of the minor neutral constituents by both the meridional and vertical circulation and vertical molecular and eddy diffusion are considered in the model. The calculated distributions of the minor neutral constituents for solar ionization only and for solar plus auroral ionization are considered. The results show that the summer-to-winter pole meridional circulation transports both NO and N(S-4) across the solar terminator into the polar night region where there is a downward vertical transport toward the mesosphere. The temperature and compositional structure and the circulation changes caused by high-latitude heating and the particle-induced production of N(D-2) and N(S-4) all combine to bring the calculated NO structure into better agreement with observations. The choice of the eddy diffusion coefficient critically controls the downward flow of thermospheric nitric oxide into the mesosphere. (Auth. mod.)

I-30504

Jacobowitz, H., Tighe, R.J., **Earth radiation budget derived from the NIMBUS 7 ERB experiment,** *Journal of geophysical research,* June 30, 1984 89(D4), p.4997-5010, 10 refs.

Results of the ERB experiment are presented in the form of time-latitude cross sections, hemispherically and globally averaged time plots, and annual global averages for the time period spanning November 1978 through October 1979. Comparisons are made between results derived from the fixed wide field-of-view (WFOV) radiometers and those derived from the scanning narrow field-of-view (NFOV) radiometers. While there is excellent agreement in regard to the spatial and temporal variations, the absolute magnitudes differ. The NFOV yields outgoing longwave fluxes and albedos that are about 4W/M2 and 2.5%, respectively, greater than those derived from the WFOV sensors. Also, limited simultaneous comparisons are made between ERB results and those from the AVHRR on the NOAA 7 operational satellite. Antarctic and/or Subantarctic data are included in the cross sections and time plots. (Auth. mod.)

I-30505

Hogan, A., **Particle concentrations at the South Pole, on meteorological and climatological time scales; is the difference important,** *Geophysical research letters,* Sept. 1984 11(9), p.850-853, 32 refs.

Sulfur and dust layers in glacial ice cores have been associated with volcanic activity. Particles collected on the South Polar Plateau during January of 1983 show the maximum concentration of sulfur aerosol to arrive at the surface from the lower troposphere at the beginning of a storm, and the maximum dust concentration to arrive from the upper troposphere as the storm weakens. The sulfur and dust particles did not arrive simultaneously on the meteorological time scale, posing a question in regard to the proper interpretation of the climatic aerosol record and the glacio-climatic record. (Auth.)

I-30548

Harris, J.M., ed, Bodhaine, B.A., ed, **Geophysical monitoring for climatic change no.11: summary report 1982,** Boulder, Colorado, U.S. National Oceanic and Atmospheric Administration, 1983, 160p.

The report summarizes global amounts of atmospheric chemical impurities as measured at four primary sampling stations (Barrow, Mauna Loa, Samoa, and South Pole) with additional measured values in related programs from a number of other stations, most of which are in northern low and mid-latitudes, but including the Palmer Station program. The clean air facility at Amundsen-Scott is described and physical problem areas are given. Floor and roof plans and electric power circuitry and distribution are included along with a sketch map of the station. A table summarizes the programs showing the gases sampled, instruments used, and frequency of measurement.

I-30549

Andreas, E.L., Tucker, W.B., Ackley, S.F., **Variation of the drag coefficient across the Antarctic marginal ice zone,** *U.S. Army Cold Regions Research and Engineering Laboratory. Special report,* MP 1784, Apr. 1984 No.84-07, MIZEX bulletin. 3. Modeling the marginal ice zone, p.63-71, ADA-145 351, 40 refs.

In Oct. 1981 the U.S.-USSR Weddell Polynya Expedition crossed the Antarctic marginal ice zone (MIZ) near the Greenwich Meridian on the *Michail Somov*. Five radiosondes, launched along a 150-km track starting at the ice edge, showed profound modification of the atmospheric boundary layer (ABL) as increasing surface roughness decelerated the flow. An equation is presented for the dependence of the drag coefficient on ice concentration that should be useful for modeling the surface stress in marginal ice zones. The sounding profiles and meteorological data provided a comprehensive look at how surface roughness and temperature changes in the MIZ can affect the ABL.

I-30557

Dolgin, M.I., **Cloud-cover parametrization scheme derived from aerological sounding in Antarctica,** *Soviet meteorology and hydrology,* 1983 No.11, p.33-37, 12 refs.

For Russian original and abstract see I-29501.

I-30558

Mokhov, I.I., Petukhov, V.K., Rusin, I.N., **Sensitivity of the mass transfer at the antarctic ice sheet to climatic changes,** *Soviet meteorology and hydrology,* 1983 No.11, p.38-45, 22 refs.

For Russian original and abstract see I-29502 or 38-2685.

I-30581

New Zealand. Meteorological Service, **Role of the New Zealand Meteorological Service in antarctic research,** *New Zealand antarctic record,* 1984 6(1), p.8-11.

A brief account is given of the New Zealand meteorological experience in Antarctica. International aspects and significance of antarctic weather, its effects on global climate and ice conditions, and environmental effects on exploitation of natural resources are suggested. Met programs in progress at Scott Base and Vanda Stations are discussed and weather conditions at those stations and at McMurdo are compared.

I-30618

Tanaka, M., **Newly-developed system for continuous measurements of atmospheric CO2 concentration at Syowa Station, Antarctica,** *Antarctic record,* Aug. 1984 No.82, p.1-11, In Japanese with English summary, figure captions, and reference list. 12 refs.

A new apparatus was developed using a non-dispersive infrared CO2 analyzer with a precision better than 0.01 ppm. Standard gases employed were CO2 in air mixtures and their concentrations which were prepared gravimetrically using an extremely precise balance, were determined against special gases with absolute accuracies of 0.1 ppm. (Auth.)

I-30635

Voskresenskiĭ, A.I., **State and prospects of meteorological research in the Antarctic,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.60-89, TT 79-52012, For Russian original see 10I-21691. 28 refs.

Soviet meteorological research over the past 20 years is reviewed. Most recent results are dealt with in greatest detail. Equipment used for meteorological observations at Soviet stations is discussed and the role of the regional meteorological center at Molodezhnaya described. A fairly full account of conclusions about atmospheric circulation and heat balance aspects of the continent's role as a heat sink is included. The plans for further research and the POLEX project are outlined. (Auth. mod.)

I-30672

Hogan, A., **On the interaction of aerosol with meteorology,** *Journal de recherches atmosphériques,* Jan.-Mar. 1984 18(1), p.41-67, With French summary. Refs. p.64-67.

Aerosol concentration, size, charge, and light scattering properties were measured several times a day at the South Pole. Simultaneous particle collections were made two to four times a day. Meteorological observations, including slow rise soundings to determine the structure of the lower atmosphere accompanied these measurements and collections. A seven-day period, which included cloudiness associated with advection of marine air over the station at its beginning, following a period of subsidence, is analyzed. Aerosol concentration was inversely correlated with ozone partial pressure during this event. Marine aerosol components dominated the cloudy and precipitating early phases of the storm. A maximum of marine, terrestrial and sulfur aerosol components occurred at the end of the storm, concurrent with ice crystal precipitation and intermittent supercooled fog, during a period of vigorous mixing caused by cold advection aloft. This was followed by a decrease in tropospheric wind speeds. Strong subsidence and a maximum of terrestrial aerosol with a minimum in sulfur concentration occurred in conjunction with a maximum in surface ozone, 36 hours following the storm. A return to more typical aerosol and ozone concentrations coincided with the re-establishment of more normal atmospheric structure. (Auth.)

I-30697

Mroz, E.J., Alei, M., **Tracking antarctic winds,** *Antarctic journal of the United States,* 1983 18(5), p.235-236, 9 refs.

Marked seasonal differences in the atmospheric chemistry observed at the South Pole reflect seasonal changes in the meridional flow of air in the high southern latitudes. An experiment designed to track the meridional flow is planned. Two tracers, 12CD4 and 13CD4, will be released in 1984. These tracers are capable of being detected thousands of kilometers from the point of release. Samples will be collected by aircraft and ground stations to detect the passage of the tracer plume.

I-30698

Wendler, G., Kodama, Y., Poggi, A., **Katabatic wind in Adélie Land,** *Antarctic journal of the United States,* 1983 18(5), p.236-238, 12 refs.

A joint U.S.-French experiment was designed in Adélie Land, where strong downslope winds are observed nearly continuously. The United States concentrated their measurements on the upper slopes while the French made their measurements in the coastal areas and telemetered their data to the year-round manned station at Dumont d'Urville. In the summer season of 1982-83, a traverse with Expeditions Polaires Françaises was made to service the previously installed unmanned automatic weather stations (AWS), obtain measurements of the boundary layer, and establish one new station. The monthly mean meteorological elements measured at D10 and Dome Circe in 1982 are shown. Boundary measurements obtained vertical profiles of dry-bulb and wet-bulb temperatures, atmospheric pressure, wind speed, and direction. These are being used to understand better the physical structure of the katabatic wind layer. An example showing the results of two soundings at D57 is presented and discussed.

I-30699

Parish, T.R., **Numerical simulation of katabatic flow,** *Antarctic journal of the United States,* 1983 18(5), p.239-241, 4 refs.

Certain coastal sections, most notably Adélie Land (67 S, 142 E), experience anomalously intense, persistent katabatic winds. The forcing of such katabatic outflow is believed to originate several hundred kilometers upslope in the interior of the continent where cold air drainage currents from a large area converge into a relatively narrow zone focused on the Adélie Land coastline. Numerical simulations with a three-dimensional hydrostatic model incorporating terrain features representative of Adélie Land reveal a significant topographical channeling of the surface airflow. Katabatic wind speeds as depicted by the model are greatly enhanced downslope of the convergence channel. These results emphasize the importance of topography in the continental interior in shaping the character of coastal katabatic flow.

I-30700

Saxena, V.K., Curtin, T.B., **Air-sea interactions over the Ross Sea in the surface boundary layer,** *Antarctic journal of the United States,* 1983 18(5), p.241-243, 7 refs.

Previous studies have demonstrated that organic particulates are present in the antarctic coastal clouds over the Ross Ice Shelf. During the period from Dec. 1982 to Jan. 1983, our investigations were extended to test hypotheses regarding the origin of these organic particulates. It is currently believed that organic particulates are produced by the wave action at the surface of the Ross Sea off the annual ice edge. The cloud water collection procedure and equipment used are described. Analysis of the collected cloud water, precipitation, sea water, and particulate samples is underway. Preliminary analysis of selected aerosol particles and cloud water residue show the presence of elements that are characteristic of organic material.

I-30701

Sheppard, J.C., Hardy, R.J., Hopper, J.F., **Antarctic hydroxyl radical measurements,** *Antarctic journal of the United States,* 1983 18(5), p.243-244, 5 refs.

This research was directed toward determination of the hydroxyl radical concentration in the lower-tropospheric air at McMurdo and South Pole Stations, using the carbon-14 tracer method. The measurement technique is described. The important reaction conditions —ozone, water vapor, temperature, and ultraviolet intensity—were determined in parallel with each hydroxyl radical measurement. Tabular data summarize the measurements. The measurements suggest that the summertime, midday hydroxyl concentrations are certainly below 500,000 per cu cm, probably lower. Comparison of the McMurdo Station and South Pole Station data with previous measurements made in Pullman, Washington, and the Caribbean Island of Barbados shows that the hydroxyl radical concentration does appear to be highest in the tropics, lowest in the antarctic polar region, and intermediate in the midlatitudes.

I-30702

Stearns, C.R., Weidner, G., **Antarctic automatic weather stations, austral summer 1982-1983,** *Antarctic journal of the United States,* 1983 18(5), p.245-246, 5 refs.

Computer based weather stations (AWS) measuring wind speed and direction, air temperature and pressure telemeter to the ARGOS system on polar orbiting satellites. The weather stations are being used to study the barrier wind around the Antarctic Peninsula and the Transantarctic Mountains, the mesoscale flow on the Ross Ice Shelf and in support of air operations at McMurdo. During AS 82-83 AWS units were installed on the Ross Ice Shelf in Windless Bight and near White Island. The AWS unit in the Asgard Mountains was removed. One unit was installed on an ice rise on the Larsen Ice Shelf by the British Antarctic Survey.

I-30703

Hogan, A.W., Murphey, B., Kebschull, K., Townsend, R., **Meteorological and aerosol experiments in Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.247-248, 1 refs.

Research programs conducted at South Pole and McMurdo Stations during the 1982-83 austral summer included the analysis of surface ozone and aerosol concentration data collected at the McMurdo cosmic ray laboratory during the previous winter, studies of the structure of near surface air over the south polar plateau using slow rising meteorological balloons, and examination of the transport of aerosol material to the polar surface from these layers. Analysis of the data collected continues. Unusually cloudy skies with a bright aureole about the sun and much hazy light scattering through the arc of 90 deg about the sun were observed at South Pole Station during Jan. 1983.

I-30704

Carroll, J.J., **Studies of atmospheric energy transfer processes at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.248-249, 4 refs.

Continuing studies of the conditions and mechanisms that affect the transfer of radiant and thermal energy near the surface at the South Pole are reported. The major focus of the current work is to describe the statistical distribution of variations in the local meteorological conditions and to examine these in terms of the fluid dynamical response of the atmospheric boundary layer to large-scale as well as local forcing. A plot of the departure of air temperature from its seasonal average vs the departure of the wind speed from its average for the austral winter of 1975 is shown as an example of the type of behavior being examined.

I-30705

Rasmussen, R.A., Khalil, M.A.K., **Rare trace gases at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.250-252, 13 refs.

The authors' research has shown that rare man-made gases including CHClF2 (F-22) and C2Cl3F3 (F-113) have reached the south pole. At present little is known about their sources or atmospheric removal processes. It is likely that these gases are very long-lived, with lifetimes of several decades. At current rates of increase the doubling time of F-22 and F-113 is only about 6 years. Present concentrations are extremely low; however, in the future the cumulative effects of these and similar compounds may become significant on the global scale. Included in this paper are 5 years of systematic measurements of CHClF2, C2Cl3F3, SF6, CHCl3, and CH3I at the south pole and, for contrast, at mid northern latitudes 45 N, Oregon).

I-30706

Murcray, D.G., **Measurement of the column densities of water, nitric acid (HNO3), fluorocarbons (CF2Cl2 and CFCl3) and ozone during the austral winter,** *Antarctic journal of the United States,* 1983 18(5), p.252.

A grating spectro-radiometer is being prepared for operation at South Pole Station during the 1984-85 austral winter. This instrument will measure the column densities of trace gases by spectral analysis of the thermal radiation from the atmosphere. Analysis of data obtained with a prototype instrument installed at South Pole Station in Nov. 1982 suggests that a spectral bandwidth of 0.5 wave number instead of the 1.5-2 wave number employed in the prototype would greatly facilitate the computation of column densities.

I-30707

Robinson, E., Bamesberger, W.L., **Air chemistry monitoring at Palmer Station,** *Antarctic journal of the United States,* 1983 18(5), p.253-254.

Preliminary results of air chemistry studies at Palmer Station in 1982 are described. The instrumentation consists of: (1) an automated electron capture gas chromatographic halocarbon analyzer for the analysis of fluorocarbons CCl2F2(F-12) and CCl3F(F-11), methylchloroform (CH3CCl3), carbon tetrachloride (CCl4), and nitrous oxide (N2O); (2) an automatic flame ionization gas chromatograph for the analysis of carbon monoxide (CO), methane (CH4), and carbon dioxide (CO2); (3) an ozone (O3) photometer; (4) a condensation nuclei (cn) counter, and (5) a Hewlett-Packard 85 data system with strip chart backup. F-12 showed a steadily increasing atmospheric concentration. The N2O time trend was also upward but at a much slower rate. The time trend for N20 was relatively small, but statistically significant. The CH4 data were also significant. Ozone concentrations ranged between 10 and 30 parts per billion, and concentrations of Aitken nuclei were generally within the range of 200 to 1,000 CN per ml.

I-30708

Holzworth, R.H., **Superpressure balloon measurements of stratospheric electric fields,** *Antarctic journal of the United States,* 1983 18(5), p.255-256, 5 refs.

The first prototype flights of a National Science Foundation and National Aeronautics and Space Administration jointly sponsored superpressure balloon experiment were launched from Christchurch, New Zealand in March 1983. The microprocessor-controlled payloads aboard the balloons were designed to obtain long-duration measurements in the stratosphere of the vector electric field and a variety of other electric parameters. The instrumentation and the preliminary results of the test flights are summarized. Both prototype flights were successful.

I-30753

Carroll, J.J., **On the determinants of the near surface temperature regime on the South Polar Plateau,** *Journal of geophysical research,* June 20, 1984 81(7), p.4941-4952, 23 refs.

Most studies of the physical climatology of the Antarctic interior focus on the local surface energy budget. The results of these studies are reviewed leading to the often cited conclusion that atmospheric heat transport is required from lower latitudes to maintain the temperature against the large radiative losses by the snow-atmosphere system of the interior plateau. Micrometeorological data taken over a 3 year period at the South Pole are presented, illustrating the annual cycle of the surface energy budget. In addition, these data, coupled with local 500 mb data, are used to examine the role of vertical and horizontal transport mechanisms in determining the near-surface temperature variations. In addition to the radiation budget, downward mixing through the boundary layer and transient horizontal advection appear far more important than local divergence or convergence effects in determining the local temperature.

I-30768

Völksch, G., Schrader, G., **Coniometric dust measurements in Antarctica** [Über konimetrische Staubmessungen in der Antarktis], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.107-111, In German with English and Russian summaries.

Dust is taken as an indicator of environmental pollution in the Antarctic. The authors apply the coniometric method and show it in a critical manner. Experimental measurements are carried through in the antarctic outdoor and indoor air. The results are discussed and compared with corresponding mean values of several rural and urban areas. In every case the indoor dust load is greater than outdoor. The values of the coniometric dust measurements obtained at Molodezhnaya in 1975 are comparable with the results of other authors. (Auth.)

I-30801

Skeib, G., **Meteorological research projects in the Antarctic from 1959 to 1984,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.5-9, With German and Russian summaries.

The review is made by sorting the period into groups of 2-3 years through 1964 and 8-11 years from 1964-82. Significant research events and projects are emphasized. Included among them are ozone measurements; aerial reconnaissance operations and radiation measurements; cloud photography; sudden atmospheric warming; large area satellite generated cloud cover charts and optical leveling; medical meteorology research; and environmental isotope research.

I-30802

Gernandt, H., **Satellite observations over Antarctica,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.9-14, With German and Russian summaries.

A brief outline is given of progress made in satellite reconnaissance of cloud and ice cover since APTs were developed in the mid-1960s. Equipment installation dates at Mirnyy and the GDR base in the Schirmacher region are given. Observational benefits derived from the satellite programs are noted.

I-30812

Rogers, J.C., **Spatial variability of antarctic temperature anomalies and their association with the Southern Hemisphere atmospheric circulation,** *Association of American Geographers. Annals,* Dec. 1983 73(4), p.502-518, Refs. p.517-518.

The spatial variability of seasonal mean temperature departures at 26 stations around Antarctica, southern South America, and nearby islands is shown using factor analysis. An opposition in temperature anomalies between mainland stations and those on or near the Antarctic Peninsula is a recurring pattern of spatial variability in all seasons but spring. Other factors indicate that temperature anomalies alternate in sign around the continent and especially near the peninsula. The association between the spatial patterns of temperature variability and features of the atmospheric circulation at middle and higher latitudes of the Southern Hemisphere is also examined. In each season the time series of one factor is significantly associated with temporal variations in the strength of the 500 mb westerlies, measured using height differences across six pairs of middle-latitude and Antarctic stations. In winter and summer the westerlies are linked to the mainland/Peninsula temperature opposition pattern such that when zonal flow is anomalously strong, mainland stations are anomalously cold. In autumn and spring, temperature variability is highly related to meridional flow strength over New zealand and in the lee of the Andes, and is associated with interannual longitudinal shifts in the positions of the climatological lows near the Antarctic coast. A deep Andes trough is associated with longer-than-usual ice duration at the South Orkneys. Historically, strong troughing and heavy sea-ice conditions in the South Atlantic occurred between 1920 and 1935. (Auth.)

I-30813

Howarth, D.A., **Analysis of the variability of cyclones around Antarctica and their relationship to sea ice extent,** *Association of American Geographers. Annals,* Dec. 1983 73(4), p.519-537, Refs. p.536-537.

Results of an analysis of the distribution and movement of extratropical cyclones around Antarctica, for the period Sep. 1973 through May 1975, are presented. Variations in seasonal cyclone frequencies, their preferred longitudinal positions, and the spatial and temporal fluctuations in latitude and pressure are shown, and these indicate good agreement with the known features of Southern Hemisphere climatology. The greatest numbers of cyclones occur during spring and fall, and their most common locations are near coastal embayments. A semiannual oscillation is present in the frequencies, mean latitudes, and mean pressures of the cyclones, although to varying degrees. Longitudinal variations in the intensity of the oscillation are also evident. The belt of maximum cyclone activity exhibits a distinct half-yearly cycle from mean monthly pressures. Harmonic analysis of the spatial variation of this belt and the simultaneous position of the sea-ice margin derived from microwave imagery suggests that there is little correlation between sea ice and cyclone tracks on a hemispheric scale. Close relationships are apparent for short time periods or in specific regions but will require more intensive study before causal mechanisms can be suggested. The asymmetry of the continent, rather than the extent of sea ice, is probably the principal factor involved in determining the longitudinal variations in the positions and tracks of cyclones around Antarctica on a hemispheric scale. (Auth.)

I-30846

Tsigel'nitskiĭ, I.I., **Structure of the atmospheric boundary layer over the southern ocean** [O strukture pogranichnogo sloia atmosfery nad IUzhnym okeanom], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.16-22, In Russian. 10 refs.

Quantitative values of atmospheric boundary-layer thermodynamics, obtained in the area between latitudes 45 and 62 S, including Australian and Atlantic portions of the southern ocean, as well as the Drake Passage, are presented. Regional differences are pointed out, showing greater turbulence over the Australian sector than in the other two areas.

I-30856

Burova, L.P., **Second All-Union Symposium "Meteorological studies in the Antarctic"** [Vtoroĭ Vsesoiuznyĭ simpozium "Meteorologicheskie issledovaniia v Antarktike"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.78-81, In Russian.

A symposium commemorating 25 years of Soviet research in the Antarctic, held October 19-22, 1981, in Leningrad, is reported. The topics discussed were the antarctic climate and its fluctuations, climatic monitoring, atmospheric structure and circulation, glaciological studies, meteorological conditions, acclimatization in man, and new methods for meteorological investigations. Recommendations are listed.

I-30857

Budretskiĭ, A.B., **New absolute minimum of air temperature** [Novyĭ absoliutnyĭ minimum temperatury vozdukha], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.82, In Russian.

A new absolute minimum of air temperature was registered at Vostok Station on July 21, 1983: -89.2 deg C, topping the August 1960 record of -88.3. After the minimum was reached, the wind direction changed from north to northwest, the wind speed increasing rapidly and the air temperature beginning to rise. According to theoretical calculations, air temperature in the area could fall below -90 deg, but this would require prolonged absence of heat advection.

I-30859

Kurzeja, R.J., Haggard, K.V., Grose, W.L., **Numerical experiments with a general circulation model concerning the distribution of ozone in the stratosphere,** *Journal of the atmospheric sciences,* July 1, 1984 41(13), p.2029-2051, 68 refs.

Two experiments were performed with a nine-layer quasi-geostrophic spectral model to simulate the distribution of ozone below 60 km. Experiment I included thermal and orographic forcing of the planetary-scale waves while experiment II did not include this forcing. Both experiments used a linear parameterization of ozone photochemistry. The two experiments were qualitatively similar but a high latitude winter ozone buildup was seen only in Experiment I. This buildup resulted from a Brewer-Dodson circulation forced by large-amplitude planetary-scale waves in the winter lower stratosphere. The model results also showed that photochemistry is important down to lower altitudes (20 km) in the summer stratosphere than was previously realized. An important photochemical discrepancy was noted between 22 and 30 km at low latitudes, where the model photochemical equilibrium mixing ratios were 25-40% larger than those inferred for the real stratosphere. This discrepancy may be due to insufficient NO2 in the model and can be resolved by more accurate daytime NO2 measurements. Antarctic regions are included in the analyses for developing the model and are shown in many of the diagrams. (Auth.)

I-30869

Voskresenskiĭ, A.I., Kamenogradskiĭ, N.E., Ustinov, V.P., **Measurements of atmospheric carbon dioxide over the ocean** [Izmereniia soderzhaniia atmosfernogo uglekislogo gaza nad okeanom], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.47-52, In Russian. 11 refs.

Data on the seasonal and meridional variations of CO2 in the atmosphere, the calibration and sampling methods and difficulties resulting in measurement errors, are discussed. Graphs showing the dependence of atmospheric CO2 on geographic latitude from Jan. through April, and atmospheric contents of water vapor recorded by the 25th and 26th Soviet Antarctic Expedition, are presented.

I-30872

Shcherbakov, IU.S., Mel'nikov, S.A., Petrov, V.N., **Observation of inorganic substance content in atmospheric precipitation at Mirnyy Observatory (25th Soviet Antarctic Expedition)** [Rezul'taty nabliudeniĭ za soderzhaniem neorganicheskikh veshchestv v atmosfernykh vypadeniiakh v raĭone observatorii Mirnyĭ (Dvadtsat' piataia sovetskaia antarkticheskaia ekspeditsiia)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.106, p.59-63, In Russian. 2 refs.

Concentrations of basic ions in atmospheric precipitation at Mirnyy Station from Jan.-Dec. 1980, and in snow layers of 1970-1979, as well as the yearly precipitation indexes and mineralization for 1979-1980, are discussed and tabulated.

I-30907

Dittrich, G., Helbig, A., **Geodetic and meteorological investigations of terrestrial refraction over the ice sheet of Enderby Land** [Geodätische und meteorologische Untersuchungen der terrestrischen Refraktion über dem Inlandeis des Enderby-Landes (Ostantarktis)], *Geodätische und geophysikalische Veröffentlichungen, Reihe III,* 1981 No.48, p.1-245, In German. Refs. p.242-245.

From Feb 1974 to Feb 1975 regular measurements were made of vertical temperature profiles, zenith angles, and other meteorological parameters on the ice sheet south of Molodezhnaya. The measurements were made at the three points of a triangle having leg lengths of 2.8, 4.8, and 5.7km using varying heights for instruments and targets. Since no model exists of the air temperature, density, and humidity along a line-of-sight for a given orography, an attempt was made to derive an empirical expression of the differences of refraction angles. This expression is based on the more readily measured parameters of wind velocity, air temperature, changes with height of air temperature, cloudiness, and sun elevation.

I-30933
De Angelis, M., **Soluble and insoluble impurities along the 950 m deep Vostok ice core (Antarctica)—Climatic implications,** *Journal of atmospheric chemistry,* 1984 1(3), p.215-239, Refs. p.237-239.

Simultaneous measurements of soluble and insoluble impurities were made on the 950 m deep Vostok ice core, spanning roughly 50,000 years. Higher continental and marine inputs during the last glacial age than during the Holocene stage were observed. A study of microparticle compositions and of volcanic indicators shows that the high observed crustal input is not due to enhanced volcanism, but is rather of continental eolian origin. For the first time, the ionic balance along a deep ice core is established, mainly used in discussing the evolution of the Cl to Na ratio over central East Antarctica with changing climatic conditions. Comparison with the Dome C results confirms the chronology of the major events: maximum terrestrial input around the last glacial maximum; end of the high continental flux over Antarctica near 13 ka bP; marine input varying in an opposing manner to isotopic fluctuations with rather high concentrations beginning to decrease when isotopic values increase and reaching Holocene values at the end of the transition between cold and warmer climate conditions. It is concluded that central East Antarctica should provide valuable data for global and Antarctic paleoclimatological models. (Auth. mod.)

I-30941
Raper, S.C.B., Wigley, T.M.L., Mayes, P.R., Jones, P.D., Salinger, M.J., **Variations in surface air temperatures. Part 3: The Antarctic. 1957-82,** *Monthly weather review,* July 1984 112(7), p.1341-1353, 34 refs.

Gridded monthly data were used to calculate monthly values of the spatial mean temperature south of 65 S. The uncertainty in the area average is estimated to be 0.22 C for the annual values prior to 1970. After 1970 there is an additional uncertainty of about 0.10-0.16 C due to the closing of Byrd Station. The annual mean and summer areal averages show significant linear warming trends amounting to 0.74 and 0.77 C respectively. Spatial characteristics of the annual and seasonal temperature variations are described using principal components analysis of the station anomaly data. The first two principal components of the annual and winter data are similar; PC1-winter is also similar to the winter pattern for linear trend found by van Loon and Williams for 1956-73. The warming trend associated with this pattern ceased in the mid-1970s. Relationships between antarctic temperatures and various parameters are investigated using linear trend and correlation analyses. Antarctic temperatures cannot be inferred from the long Orcadas record and the relationships between antarctic temperatures and sea ice extent are complex. The most significant correlations between mean antarctic temperature and sea ice extent averaged around Antarctica are found in spring; warm springs tend to be associated with anomalously large maximum sea ice extent. Lower antarctic temperatures occur during summers and winters with strong westerlies (significant at the 0.1% level in summer and at the 1% level in winter). (Auth.)

I-30971
Fleming, D.A., **Antarctic automatic weather stations as forecasting aids,** *Antarctic journal of the United States,* 1983 18(5), p.302-303.

The importance of automatic weather stations as forecasting aids in the Ross Island region is discussed. Fog seems to be the most difficult weather event to forecast for Williams Field and the ice runway. A close look at dense fog occurrences during the period from Nov. 1, 1982 to Jan. 31, 1983 revealed a strong correlation between a wind within the southeast quadrant at Ferrel Station (8907) and dense fog at Williams Field. Observations indicate that moisture advection into the Williams Field region occurs when the surface flow backs into the southeast quadrant in the region of station 8907. The fog often occurs 3 to 8 hours (or more) after the wind shift.

I-30976
Walton, D.W.H., **Terrestrial environment,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.1-60, Bibliography p.51-60.
DLC QH84.2.A58 1984

The geography of the Antarctic has been pieced together from the efforts of many nations over more than 200 years. Good topographical maps cover all of the continent and other maps in preparation show sub-ice details. A growing body of maps showing various hypotheses on the geological evolution of Gondwanaland to the present distribution of land in the southern hemisphere is the result of attempts to unite data from various disciplines into a common theory. Amidst the data and speculation of these other scientific disciplines there is much of great use to the biologist. Reviewed in this chapter are elements in climatology, geography, meteorology and pedology, which are of importance in a biological context with suggestions of some profitable lines for future research in these fields. (Auth.)

I-31015
Akademiia nauk SSSR. Mezhduvedomstvennyĭ geofizicheskiĭ komitet, **Report on scientific activity in meteorology and atmospheric physics 1979-1982** [Soobshchenie o nauchnykh rabotakh po meteorologii i fizike atmosfery 1979-1982], Moscow, 1983, 260p., Presented to the International Association of Meteorology and Atmospheric Physics for the XVIII General Assembly of the International Union of Geodesy and Geophysics. In Russian and English. Numerous refs.

Chapter 5 of this book deals with polar meteorology, and is presented in Russian (p.68-78) and English (p.205-211). The chapter is a general review of publications covering upper air meteorological investigations in the Arctic and the Antarctic, with particular reference to general circulation and long range weather forecasting, the use of weather satellite data, and climatic variations. Observational networks in both regions are listed; atmospheric studies within the POLEX program are also cited. 50 references are included.

I-31069
Hoffman, J.S., Keyes, D., Titus, J.G., **Projecting future sea level rise. Methodology, estimates to the year 2100, and research needs,** Washington, U.S. Environmental Protection Agency, Oct. 1983, 121p., EPA 230-09-007, 2nd revised edition. Numerous references.

It is reported that concentrations of greenhouse gases will almost certainly double in the next century. The possibility of deglaciation as a source of land-to-sea transfer of snow and ice is discussed. The vulnerability of the West Antarctic ice sheet to such deglaciation is pointed out. Methods to estimate the potential contributions of ice and snow to sea level are presented. Numerous tables, including the distribution of ice and snow on land and sea in both hemispheres, estimates of global sea level rise and the categories of decisions such a rise will influence, are shown. Research needed to improve understanding of snow and ice melting, oceanic warming around Antarctica, and glacial ice discharge, is outlined.

I-31071
Koshel'kov, IU.P., **Climatology of the middle atmosphere of the Southern Hemisphere,** *Journal of atmospheric and terrestrial physics,* Sep. 1984 46(9), p.781-798, 55 refs.

Main features of spatial distribution and time variations of meteorological parameters in the Southern Hemisphere at altitudes 25-80 km are reviewed on the basis of zonal empirical models revised in 1982. Meridional distribution and seasonal variations are analysed. For comparison purposes with the Northern Hemisphere, a model developed in 1978 is used. Meridional distribution of the parameters in summer is characterized by higher values of temperature, pressure and density gradients in the stratosphere of the Southern Hemisphere than in that of the Northern Hemisphere. This resulted in greater advancement of the core of the summer-time easterly flow towards the equator in the Southern Hemisphere than in its northern counterpart. In the wind field, specific features of the Southern Hemisphere westerly flow are high intensity and relatively low altitude of the maximum speed as compared to the Northern Hemisphere. In summer, temperature and pressure fields based on satellite data are symmetric relative to the poles in both hemispheres. In winter, the distortion of the mean pressure field in the mesosphere may be as great in the Southern as in the Northern Hemisphere. (Auth. mod.)

I-31076
Yamanouchi, T., Kawaguchi, S., **Longwave radiation balance under strong surface inversion in the katabatic wind zone, Antarctica,** *Journal of geophysical research,* Dec. 20, 1984 89(D7), p.11,771-11,778, 27 refs.

Measurements and calculations of longwave radiation fluxes, to clarify their characteristic features under a surface inversion and with katabatic winds, were made at Mizuho Station in the 1978-1979 season. Direct measurements of the downward and upward longwave fluxes were extended through day and night using pyrgeometers with a simple shading ring to cut off heating by direct solar radiation. Longwave radiation fluxes were calculated using a simple wind band model, and the effect of the surface inversion was examined. The daily average of the downward flux varies greatly between 90 and 240 W/sq m. The large day to day variation is due to clouds. Overcast skies give an increase of about 80 W/sq m in the downward longwave flux in all seasons. The effective emissivity of the atmosphere for clear sky is very small on account of the small amount of column water vapor. The drifting snow near the surface caused by the strong wind increases the downward longwave flux and suppresses the longwave cooling at the surface. The relation between the strength of the surface inversion and longwave fluxes is examined and approximated by a linear relation. When the surface inversion becomes strong, the net longwave flux decreases. (Auth.)

I-31099
Hervey, S.P., **Study of antarctic remote site automatic weather station data (1980-81) from the Ross Ice Shelf area,** Monterey, Naval Postgraduate School, March 1984, 170p., ADA-143 738, Master's thesis. 9 refs.

The third generation of the Antarctic remote-site Automatic Weather Stations (AWS2B) was installed at various locations during austral summer (1979/80). The quality and quantity of surface pressure, wind (speed and direction) and temperature data show a marked improvement over that of the earlier AWS platforms (1976-80) examined by personnel at the Naval Postgraduate School. Statistical processing of data from February 1980 to December 1981 was done in order to contribute to a base climatology for AWS sites and to investigate possible operational applications of the data to the United States Antarctic mission. Comparisons were made between synoptic reports collected at McMurdo, Antarctica and the data obtained from the surrounding AWS2B stations. (Auth.)

I-31100
Ball, D., **Feasibility of long duration ballooning in Antarctica,** *National Center for Atmospheric Research. Technical note,* July 1984 NCAR/TN-239+PPR, 14p. PB84-240571.

This report outlines a plan for balloon operations in Antarctica. It includes discussions of the logistical, atmospheric, and electronics support problems associated with a proposed balloon campaign in the Antarctic. Despite the many obstacles to be overcome, it would appear that it is feasible to achieve long duration balloon flights from the South Pole. (Auth.)

I-31102
National Research Council. Committee on Glaciology, **Environment of West Antarctica: potential CO2-induced changes: report of a workshop held in Madison, Wisconsin, 5-7 July 1983,** Washington, D.C., National Academy Press, 1984, 236p., PB85-110 757, Numerous refs. For individual papers see 39-1499 through 39-1510 or F-31103, F-31106, F-31110, F-31114, I-31104, I-31105, I-31107 through I-31109, I-31111, I-31112 and J-31113.

It has been suggested that a rapid reduction of the ice mass of West Antarctica leading to a drastic rise in sea level might result from CO2-induced warming. Climate factors that provide the principal external forcing for glacial ice of West Antarctica are examined. Topics discussed include: historical changes of atmospheric CO2 and other environmental variables; changes in polar ice sheets; knowledge of the present state of the environment of West Antarctica; model simulations of the present environment; and model predictions of potential CO2-induced changes. Recommendations are made for improving existing data sets and testing and improving model simulations of the atmospheric environment. (Auth.)

I-31104
Loon, H. van, **Variability of atmospheric circulation at the surface of the South Pacific Ocean in summer,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.63-72, PB85-110 757, 9 refs.

A description is given of the ocean currents about the Antarctic Peninsula and in the Weddell Sea. It is based primarily on data gathered in those regions by whaling crews during the IGY. The data consist of temperatures at a depth of 200 m which define the currents around the continent when used in conjunction with surface weather patterns. A series of charts showing these elements augments the text.

I-31105
Trenberth, K.E., **Atmospheric circulation affecting the west antarctic region in summer,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.73-87, PB85-110 757, 12 refs.

A series of charts and graphs of the Southern Hemisphere circulation is discussed in the text. Parameters of these visual displays include, among others: geostrophic wind in cross section; mean geopotential height fields at 500 mb; 1000-500 mb thickness field; geostrophic westerly wind component at 500 mb; locations of maximum occurrences of various phenomena related to storm frequency. The erratic nature of rawinsonde data for many of the antarctic stations is pointed out as a reason for lack of understanding of weather processes on and near the continent.

I-31107
Carleton, A.M., **Associated changes in west antarctic cyclonic activity and sea ice,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.96-106, PB85-110 757, 9 refs.

A series of charts is presented to show the relationship between the extent of pack ice and cyclonic activity. The period of this analysis generally extends from about 1972 through 1979. Summer and winter sea ice extents and cyclogenesis/cyclolysis patterns are shown and significant features are compared.

I-31108

Bromwich, D.H., **Precipitation regime of the west antarctic ice sheet,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.107-115, PB85-110 757, 14 refs.

This set of charts depicts humidity over West Antarctica and the air flow over the pack ice with cyclonic centers over the Ross and Weddell Seas. It is concluded that earlier estimates of the moisture holding capacity of west antarctic air were about four times too high because low tropospheric temperatures were modeled 10C too warm.

I-31109

Limbert, D.W.S., **West antarctic temperatures, regional differences, and the nominal length of summer and winter seasons,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.116-139, PB85-110 757, 24 refs.

Available west antarctic temperature records are discussed, related to other antarctic regions, and, where possible, to the atmospheric and oceanic circulations. Because of the sparseness of long temperature records, some proxy data based on snow accumulation rates are used. (Auth.)

I-31111

Schlesinger, M.E., **Atmospheric general circulation model simulations of the modern antarctic climate,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.155-196, PB85-110 757, 42 refs.

Modern summer and winter climates in and around Antarctica are simulated by six contemporary atmospheric general circulation models. Also shown for each model are the number of vertical layers, pressure at the top of the model atmosphere, horizontal variation of dependent variables, horizontal resolution, source for the prescribed SST and sea ice, and months used to form the summer and winter climates. An example of the prescribed surface boundary conditions is given. (Auth.)

I-31112

Semtner, A.J., Jr., **On modeling the oceanic environment of West Antarctica, including CO2-induced changes,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.197-211, PB85-110 757, 17 refs.

Elements of the model are set forth and their places in the structure and their influence are discussed. Some of the topics elaborated on are atmospheric response to changes in sea surface temperatures, sea ice, current layers and their interactions and influence, and ice shelf melting as warm currents intrude. Numerous diagrams, graphs, and charts are presented and explained.

I-31137

Radok, U., **Lower atmosphere of the polar regions,** *Geologische Rundschau,* May 1981 70(2), p.703-724, In English with German, French and Russian summaries. Refs. p.721-724.

DLC QE1.G4917

Four studies of the free polar atmosphere with kites and tether balloon soundings to above 3000 m, polar aerology advanced to the first full upper air network during the IGY (1957/8). While its replacement by satellite remote sensing is gradually taking shape, the accumulated polar information has been thoroughly analyzed; a series of comprehensive accounts is referenced. The topics singled out for this review are the surface energy balance and the polar inversion, the katabatic winds and snow drift, and the aerosols of the polar atmosphere. (Auth. mod.)

I-31138

Flohn, H., **Hemispheric circulation asymmetry during Late Tertiary,** *Geologische Rundschau,* May 1981 70(2), p.725-736, In English with German, French and Russian summaries. Refs. p.735-736.

DLC QE1.G4917

Recent data obtained within the Deep Sea Drilling Project in the southern oceans revealed that the formation of antarctic sea-ice started 38 m.y.b.p. ago at the beginning of the Oligocene. The antarctic ice-cap reached nearly its present volume during the Middle Miocene (14-12 m.y.b.p.) and a volume greater than the present during the Messinian (6-5 m.y.b.p.). This evolution indicates a period of about 10 m.y. during which East Antarctica was highly glaciated, while the Arctic Ocean was essentially ice-free. This asymmetric pattern is compared with the present asymmetry (unipolar versus bipolar glaciation); the annually averaged position of the "meteorological equator" had then displaced from about Lat. 6 deg N today to about 10 deg N. Some estimates of the heat budget terms in polar latitudes at a glaciated continent and at an ice-covered ocean are given. A preliminary review of paleoclimatic data reveals significant shifts of the position of the climatic belts at both hemispheres. (Auth. mod.)

I-31169

Schaller, E., **MEFIS—a mesoscale meteorological experiment in the edge area of the Filchner Ice Shelf** [MEFIS—ein mesoskaliges meteorologisches Experiment im Kantenbereich des Filchner Schelfeises], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.165-171, In German.

The experiment, conducted by three institutions having meteorological programs, was undertaken over a period of about one month. The objective was to gather near-surface atmospheric data in the vicinity of the edge of the ice shelf over a horizontal range of about 40-45 km. This was done by setting out a network of automatic sensors which measured temperature, humidity, wind speed and direction. Analyses of the data will be used to assess boundary layer problems of temperature discontinuities, daily energy variations, and case studies of lower atmosphere disturbances. Discussions and charts deal with gathering of the data and the uses to which they will be put.

I-31257

Komura, K., **Environmental radioactivity in Antarctica,** *Polar news,* July 1984 No.39, p.46-51, In Japanese.

Radioactivity in Antarctica is discussed mainly from the viewpoint of environmental radioactivity of the samples collected from the Dry Valleys area in southern Victoria Land. The level of contamination by artificial radionuclides and its characteristic features are compared with those in the temperate zone of the Northern Hemisphere. Contamination of Antarctic meteorites and measurements of uranium isotopes in the saline waters are also discussed. (Auth.)

I-31267

Robinson, E., Bamesberger, W.L., Menzia, F.A., Waylett, A.S., Waylett, S.F., **Atmospheric trace gas measurements at Palmer Station, Antarctica: 1982-83,** *Journal of atmospheric chemistry,* 1984 2(1), p.65-81, 16 refs.

In early 1982 a station capable of sampling atmospheric trace gas constituents on a continuous basis was established at Palmer Station. Sampling operations began about February 1, 1982. This is an initial report on this station, its location, equipment and general research objectives along with some initial sampling results. The constituents being measured and recorded were: ozone, methane, carbon dioxide, carbon monoxide, fluorocarbon-11, fluorocarbon-12, carbontetrachloride, methylchloroform, nitrous oxide, and Aitken nuclei (CN). Data storage, data processing, and sampling system control is handled by a Hewlett-Packard 85 system. Preliminary analyses of about the first 20-22 months of data are presented and show not only the expected long-term trends but also shorter period concentration cycles that seem to be related to synoptic meteorology. (Auth.)

I-31293

Kukla, G., ed, Imbrie, J., ed, Saltzman, B., ed, Hays, J., ed, NATO Advanced Research Workshop on Milankovitch and Climate, 1982, Palisades, N.Y., **Milankovitch and climate,** NATO ASI Series C: Mathematical and physical sciences, Vol.126, Dordrecht, D. Reidel, 1982, 895p. in 2 vols., Refs. passim. For selected papers see 39-1984 through 39-1992 or I-31294 through I-31300.

DLC QC884.N185

At an international symposium 100 scientists met to consider one of the unsolved geophysical problems: the origin of the pleistocene ice ages, and in particular to review and evaluate the progress made in understanding and modelling the physical mechanisms by which the climate-system responds to the calculated changes in the pattern of incoming solar radiation. The proceedings contain the complete texts of over 50 papers. Author and subject indexes are provided.

I-31295

North, G.R., Mengel, J.G., Short, D.A., **Two-dimensional climate model useful in ice age application,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.513-518, 18 refs.

DLC QC884.N185

The present model which is easily and efficiently solved should prove useful for future studies coupling a simple climate model with a deluxe ice sheet model. The climate model already has the property that glaciers have the potential for growing in the right places and with a reasonable sensitivity (especially with the assistance of CO2 changes). The model in its present form has some rich mathematical structure associated with geography leading to abrupt transitions in ice area as parameters are slowly varied.

I-31296

Broecker, W.S., **Terminations,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.687-698, 22 refs.

DLC QC884.N185

The coincidence between the termination of major glaciations in the northern and southern hemispheres is not easily explained. The association between these events and peaks in Northern Hemisphere seasonality suggests that these rapid warmings are linked to the earth's orbital cycles. The lack of correlation between terminations and the seasonality record for the Southern Hemisphere suggests that the Southern Hemisphere terminations must have been driven by events in the Northern Hemisphere. The global sea level rise associated with the melting of the large Northern Hemisphere ice sheets does not appear to be the link because the events in the Antarctic Ocean clearly led the O18 change in the sea. Large changes in the pattern of deep sea ventilation or CO2 changes in the atmosphere seem to be the agents of interhemispheric transmittal of the climatic message. (Auth. mod.)

I-31297

Young, M.A., Bradley, R.S., **Insolation gradients and the paleoclimatic record,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.707-713, 12 refs.

DLC QC884.N185

Hemispheric insolation gradients play an important role in driving the global atmospheric circulation, and may have contributed to the growth and decline of continental ice sheets by modulating the transport of moisture to high latitudes. Mid-monthly insolation differences between 30 and 90 deg latitude in each hemisphere were computed at 1000 years intervals for the past 150,000 years. Times of rapid ice build-up correspond to a distinctive seasonal pattern of insolation gradient deviations, with generally high gradients throughout the year, and follow closely times of strong autumn insolation gradients. The opposite patterns are observed at times of ice wastage. (Auth.)

I-31298

Royer, J.F., Deque, M., Pesiaux, P., **Sensitivity experiment to astronomical forcing with a spectral GCM: simulation of the annual cycle at 120,000 BP and 115,000 BP,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.733-763, 21 refs.

DLC QC884.N185

The primary response of the atmosphere to the anomalies in the distribution of incident solar radiation by latitude and season introduced by the secular variations of the Earth's orbital elements (other boundary conditions being specified) was investigated. The annual cycle of climate at 125,000 years BP and 115,000 years BP was simulated. The physical parameterizations of the model include a simplified radiative scheme with diurnal variation of insolation, interactive cloudiness based on relative humidity, detailed hydrologic cycle and surface processes with computation of soil temperature, water content and snow cover. Two simulations of a complete annual cycle were compared. Differences between the statistics of the two experiments show a characteristic response of the atmospheric temperatures and circulation to the insolation anomaly. (Auth. mod.)

I-31299

Sellers, W.T., **Response of a climate model to orbital variations,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.765-788, 13 refs.

DLC QC884.N185

A three-dimensional global climate model is used to study the response of the earth-atmosphere system to variations in the earth's orbit about the sun. Three different sets of orbital parameters are used in computer runs of 20 model years. The results indicate that the greater the summer insolation, the greater the temperature difference and the stronger and more dependable the monsoon circulation and its attendant summer rainfall. The model snow cover and sea ice area vary only slightly with changes in the orbital parameters, possibly because of deficiencies in the model. (Auth. mod.)

I-31300
Manabe, S., Broccoli, A.J., **Influence of the CLIMAP ice sheet on the climate of a general circulation model: implications for the Milankovitch theory,** NATO ASI Series C: Mathematical and physical sciences, Vol. 126, Milankovitch and climate. Edited by A. Berger, J. Imbrie, J. Hays, G. Kukla, and B. Saltzman, Dordrecht, D. Reidel, 1982, p.789-799, 15 refs.
DLC QC884.N185

This study investigates the influence of the 18 kyr BP ice sheet on the earth's climate by use of a mathematical model which consists of three basic units: a general circulation model of the atmosphere, a heat and water balance model over the continents, and a simple model of the oceanic mixed layer. A brief description of these three units is given. The results of the study suggest that the effects of increased continental ice extent alone are insufficient to explain the glacial climate of the Southern Hemisphere.

I-31318
Ryzhakov, L.IU., **Analogous groupings of atmospheric processes of the Southern Hemisphere and their use in long range forecasting in the Antarctic** [Gruppovye odnorodnye atmosfernye protsessy iuzhnogo polushariia i ikh ispol'zovanie dlia dolgosrochnykh prognozov po Antarktike], *Leningrad. Arkticheskiĭ i Antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1984 Vol.397, p.55-62, In Russian. 9 refs.

Conditions conducive to late and cold springs in East Antarctica were studied by observation of prolonged atmospheric processes. Analogous groupings of processes between May and August, showing circulation characteristics and pressure and temperature anomalies can serve as a basis for forecasts for the period between the following September and November.

I-31397
Hidaka, H., **Environmental pollution of chlorinated hydrocarbons in the Antarctic,** *Polar news,* Feb. 1984 No.38, p.9-14, In Japanese.

DDT and PCB levels in air, snow, seawater, marine invertebrates, fish, Weddell seals etc. collected by the 22nd JARE (1980-1982) around Showa Station were determined and the bioaccumulation and environmental dynamics of these chemicals in the Antarctic are discussed. Concentration levels of DDT and PCBs in the antarctic marine ecosystem are much lower than those in the other oceans. The low concentration of these chemicals in seawater under antarctic fast ice may be caused by characteristics of the antarctic environment, such as isolation from the outer world, ice covering, and high bioproductivity in austral summer among others. Additionally, specific characteristics of environmental pollution by chlorinated hydrocarbons in the Antarctic are discussed.

I-31401
Rycroft, M.J., **Atmospheric research in Antarctica,** Fundamental studies and the future of science, edited by C. Wickramasinghe, University College Cardiff Press, 1984, p.285-300, 10 refs.
DLC Q158.5.F86 1984

The particular advantages to be gained by studying atmospheric sciences in and around Antarctica stem from two facts. The first is that Antarctica is a cold, high dome entirely surrounded by oceans. Thus, from the viewpoints of meteorology and climatology, the situation is markedly different from that in the Arctic. The stratospheric polar vortex over Antarctica persists until the late spring whereas, in the North, breakdowns can occur as early as mid-winter, with a weaker vortex usually reforming after such early breakdowns. The second fact is that the geomagnetic dip pole is twice as far from the geographic pole in the South as it is in the North. Thus the behavior of the ionosphere, driven by forces of magnetospheric origin, is different in the two hemispheres. Some examples of results obtained at three British Antarctic Survey bases which illustrate such points are presented and put into global context within the field of solar-terrestrial physics. (Auth.)

I-31403
Hofmann, D.J., Rosen, J.M., **Antarctic observations of stratospheric aerosol and high altitude condensation nuclei following the El Chichon eruption,** *Geophysical research letters,* Jan. 1985 12(1), p.13-16, 19 refs.

A balloon sounding to 32 km altitude was conducted at the U.S. station on McMurdo Sound in Antarctica in October 1983. The purpose was to determine the extent to which sulfuric acid aerosol from the April 1982 eruption of the Mexican volcano El Chichon had affected the Antarctic stratospheric aerosol layer and if sulfuric acid condensation nuclei are produced at high altitude in the Antarctic stratosphere as had been observed in the Northern Hemisphere during the late winter - early spring period. The results indicate that stratospheric transport to the south polar region was very effective with aerosol mixing ratios observed to be similar to those in the Northern Hemisphere for the same time period. Observation of relatively high concentrations of condensation associated temperature variations tend to support the validity of an aerosol production process proposed to explain earlier Northern Hemisphere results. (Auth.)

I-31430
Bacastow, R., **Influence of the southern oscillation on atmospheric carbon dioxide,** Fate of fossil fuel CO2 in the ocean. Edited by N.R. Andersen and A. Malahoff, New York, Plenum Press, 1977, p.33-43, 21 refs.
DLC GC117.C37F37

The atmospheric CO2 record at the South Pole, after the seasonal effect is removed, reveals a small anomaly with a period of three to four years and an amplitude of about one part per million. The rate of change of this anomaly, and the corresponding anomaly at Mauna Loa, Hawaii, correlate well with the usual index of the Southern Oscillation. The correlations indicate that CO2 is removed from the atmosphere at times of stronger than average trade winds and Mid Latitude Westerlies. It is suggested that CO2 enters the Southern Mid Latitude oceans more rapidly during times of increased Westerlies. A more complete explanation of the relationship implied by the correlation should aid our understanding of how and where fossil fuel CO2 enters the oceans. (Auth. mod.)

I-31441
Flohn, H., **Major climatic events associated with a prolonged CO2-induced warming,** Oak Ridge, Associated Universities, Oct. 1981, 80p., DE82 004909, Refs. p.71-80.

Two climatic events are possible if CO2 concentrations reach levels above 600 ppM, and if other greenhouse gases increase simultaneously, leading to an increase in global average temperature. One event, the disintegration of the West Antarctic ice sheet, last occurred about 120 thousand years ago, the other, the disappearance of the shallow drift ice in the Arctic Ocean, last occurred about 2.4 million years ago. Although this suggests that the West Antarctic ice is more fragile than the Arctic sea ice, the events may occur in the opposite order. The disappearance of the Arctic sea ice would constitute a case of unipolar glaciation. Paleoclimatic evidence suggests that the earth has experienced long periods of unipolar glaciation and that the effects of such radical asymmetry on global climate would be far-reaching. (Auth. mod.)

I-31447

Robinson, E., Clark, D., **Latitudinal distribution of carbon monoxide across the Pacific from California to Antarctica,** *Journal of atmospheric chemistry,* 1984 1(2), p.137-149, 27 refs.

Results of a program of mid-tropospheric CO measurements aboard an LC130 airplane are reported. The data both extend and support other research studies of the latitudinal distribution of carbon monoxide in that higher concentrations are evident over the Northern than over the Southern Hemisphere. Carbon monoxide concentrations range between 50 and 60 ppb with a few peaks into the 60s in the latitudinal area south of the ITCZ and values of 80 ppb or higher at latitudes north of Hawaii. A comparison is also made of carbon monoxide and ozone concentrations along the flight tract between California and Antarctica, over the Ellsworth Mountains of Antarctica, and between 78 S and the South Pole. These ozone-carbon monoxide data show statistically significant negative correlations in the upper troposphere and lower stratosphere over Antarctica. It is believed that this is a good indication of mixing across the tropopause. (Auth.)

I-31455

Wendler, G., Kodama, Y., **On the climate of Dome C, Antarctica, in relation to its geographical setting,** *Journal of climatology,* Sept.-Oct. 1984 4(5), p.495-508, 34 refs.

The annual course of temperature displays the typical "coreless" winter phenomenon, with no systematic temperature changes for 4 to 5 months, and mean temperatures of about -60 deg C during this time. The wind speeds observed at Dome C were the lightest, not only of all interior stations in Antarctica, but of all antarctic stations, including coastal and near-coastal ones. This illustrates the well-known dependence of the katabatic winds on slope angles and topography. Despite steep and deep surface inversions, katabatic winds generated at higher elevations on the continental slopes do not appear to override Dome C, but flow around it. By contrast, the winds observed in the coastal regions of Adélie Land, some 1000 km away from Dome C, belong to the strongest found anywhere on earth. (Auth. mod.)

I-31502

Mognard, N.M., Campbell, W.J., **Comparison of sea surface wind speed fields by SEASAT radar altimeter, scatterometer, and scanning multichannel microwave radiometer, with an emphasis on the southern ocean,** European Space Agency, ESA SP-215, International Geoscience and Remote Sensing Symposium (IGARSS '84), Strasbourg, Aug. 27-30, 1984. Proceedings. Remote sensing—from research towards operational use, Paris, Aug. 1984, p.403-409, 20 refs.

Three of the microwave sensors on board the SEASAT satellite, the altimeter (ALT), the scatterometer (SASS), and the scanning microwave multichannel radiometer (SMMR) measured the sea surface wind speed. During the satellite lifetime from June to October 1978, the Austral winter, the highest wind speeds were recorded in the southern ocean. Three-month, monthly, and three-day surface wind speed fields deduced from the three SEASAT wind speed sensors are analysed and compared. The monthly and three-day fields show a pronounced mesoscale (1000 km) variability in wind speed. At all space and time scales analyzed, differences of about 40% are found in the magnitude of the wind speed features, with the ALT consistently yielding the lowest wind speed and the SMMR the highest.

I-31587

Cerni, T.A., Parish, T.R., **Radiative model of the stable nocturnal boundary layer with application to the polar night,** *Journal of climate and applied meteorology,* Nov. 1984 23(11), p.1563-1572, 33 refs.

A graybody, longwave, radiative transfer model based on revised estimates of the absorption characteristics of CO2 and H2O is proposed. The model is computationally efficient and is designed for use within larger mesoscale primitive equation models. Tests have shown that the graybody model accurately simulates atmospheric heating rates as predicted by more detailed radiation models. When incorporated within a simple one-dimensional model, the radiation parameterization provides realistic simulations of the strong temperature inversion over the interior of Antarctica in winter. (Auth.)

I-31612

Görlach, U., Wagenbach, D., Kipfstuhl, J., Stuckenberg, U., **Glaciological trace element investigations at German antarctic stations** [Spurenstoff-glaziologische Untersuchungen an den deutschen Antarktisstationen], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.42-49, In German with English summary.

Surface snow, ice cores and aerosol samples in the vicinity of G. v. Neumayer Station were analyzed to learn of the seasonal pattern as well as the lateral and vertical distribution of sea salt deposition. A maximum sea salt production in the austral autumn could be detected clearly in aerosol and dated snow samples. Caused by the small distance to the open ocean surface, extremely high sea salt concentrations (up to 200 mg/kg) are a common phenomenon. Apart from this local effect, it is expected that a combination of stable isotope (O-18, D) and sea salt measurements in snow samples can help to identify different drainage areas of antarctic ice shelves. (Auth.)

I-31617

Schaller, E., **Change in the atmospheric boundary layer with the passage of a synoptic disturbance at Filchner Station** [Die Umstellung der atmosphärischen Grenzschicht beim Durchgang einer synoptischen Störung im Bereich der Filchner-Station], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.72-77, In German with English summary. 2 refs.

A mesoscale meteorological experiment was performed during the Antarctic summer season 1983/84 in the vicinity of the German summer station "Filchner" including three stations with vertical soundings (tethersondes, radiosondes) and six automatic stations monitoring the near-surface temperature, humidity, wind speed and direction. A case study is presented showing the temporal change of the boundary layer structure due to a strong synoptic forcing. (Auth.)

I-31618

Rose, L., **Are there secondary flows at the edge of the Filchner Ice Shelf** [Gibt es Sekundärströmungen am Rande des Filchner-Schelfeises], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.78-85, In German with English summary. 4 refs.

The first period of intense measurements of the "Mesoscale Experiment at the edge of the Filchner Ice Shelf MEFIS" temporarily showed a local wind system in the ice-shelf, polynya and sea-ice marginal zone Under a large scale wind of less than 3 m/s a thermally induced confluence was found over the coastal polynya, which can be held responsible for the often observed lower clouds parallel to the edge of the ice shelf. (Auth.)

I-31619

Kottmeier, C., **Flow models in katabatic winds** [Strömungstypen bei katabatischem Wind], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.86-96, In German with English summary. 2 refs.

Based on measurements during the meteorological program MEFIS of the Filchner Ice Shelf Expedition 1984, the drainage wind over the Filchner Ice Shelf is discussed. Theoretical considerations and the measurements show that significant drainage winds are not caused by the ice surface inclination alone. A mechanism is pointed out, which relates the observed katabatic wind to different thermal structures of the atmosphere over the inner shelf ice and the marginal zone. (Auth.)

I-31620

Halbsguth, G., **Case study of a mesoscale disturbance at Filchner Station** [Fallstudie einer Mesostörung im Bereich der Filchner-Station], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.96-103, In German with English summary.

During the Antarctic summer season 1983/84 the influence of a mesoscale-disturbance on the atmospheric boundary layer of the Filchner/Ronne-iceshelf was measured. Vertical soundings with tethersondes and radiosondes at two stations at a distance of 25 km show the spatial and temporal structure of the phenomenon. It can be classified to the mesoscale beta. (Auth.)

I-31622

Mattern, G., **On a sferics-induced emission in the VLF range** [Über eine von Sferics ausgelöste Emission im VLF-Bereic[illegible] Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.113-117, In German with English summary. 3 refs.

Observing the sferics in the VLF range, one can hear the so called "tweek", a special form of sferics at middle latitudes nearly every second night. Closer investigation on tweeks shows that not only line wave guide dispersion leads to the generation of the tweeks. During those nights, in most cases the sferics of far away thunderstorms are connected to emissions triggered by sferics. That emission follows the beginning of the sferic after two to six milliseconds. The amplitudes are commonly smaller than those of the tweeks and usually only a small band in the audio frequency range is stimulated. According to the introductory results of a journey by the FS *Polarstern* from Bremerhaven to Rio de Janeiro the biggest time lag is observed at the equator area. Measurement at Georg von Neumayer Station in the Antarctic shows that this phenomenon is rarer there and that time lag is only about one millisecond. (Auth.)

I-31627

Pinto Coelho, A., Rangel Nunes, M., Freitas Mourao, R.R., **Global solar radiation measurements in Antarctica** [Medidas de radiação solar global na Antártida], *Rio de Janeiro. Instituto Brasileiro de Estudos Antárticos. Boletim,* Jan. 1985 No.4, p.7-10, In Portuguese. 12 refs.

Preliminary results of a study carried out at a Brazilian station on King George I. between Dec. 3 and 12, 1984, show that in spite of daylight up to 20 hrs. of duration the global radiation incidence was low, as direct solar radiation could not be measured due to cloudiness. The highest value was recorded on Dec. 8 at 11 a.m. (1.44cal/sq cm/min.)

I-31632

Gras, J.L., **Ammonia and ammonium concentrations in the antarctic atmosphere,** *Atmospheric environment,* 1983 17(4), p.815-818, 22 refs.

DLC TD881.A8

Concentrations of gaseous ammonia and particulate ammonium ion were determined at the South Pole and near Lake Vanda in the Wright Valley, Victoria Land, during November-December 1980. Ammonia gas concentrations represented a small fraction of the total ammonia. At the South Pole the particulate sulphate was apparently nearly fully neutralized by ammonium whereas in the Wright Valley there was evidence of a greater maritime component and a smaller fraction of ammonium in the aerosol. (Auth.)

I-31641

Pleshcheev, IU.G., Frolov, V.I., **Radar measurements of atmospheric precipitation in Antarctica** [Izmerenie osadkov v Antarktide s pomoshch'iu MRLS], Radiolokatsionnaia meteorologiia (Radar meteorology) edited by V.D. Stepanenko and G.B. Brylev, Leningrad, Gidrometeoizdat, 1984, p.64-67, In Russian. 9 refs.

Precipitation in coastal Antarctica is basically of cyclonic nature. Snowfall is usually accompanied by strong winds complicating the traditional methods of measurement. Radar techniques were used for measuring snow accumulation over large areas. Coefficients of dependence of radar reflections on snowfall intensity were obtained for fine dry snow during passage of antarctic-front cyclones and correction coefficients for wind error were established for the Tretiakov precipitation gage.

I-31645

Pinto Peixoto, J., **Energetics of the general circulation of the atmosphere in the Southern Hemisphere during the IGY, Part 1: the distribution of atmospheric energy,** *Archives for meteorology, geophysics, and bioclimatology. Ser. A,* 1982 31(4), p.277-301, With German summary. 9 refs.

DLC QC851.A73

Results of evaluation of different forms of available potential energy and kinetic energy based on direct observations of temperature, wind and geopotential carried out in the Southern Hemisphere during the IGY, are presented. The spatial distribution of various energy forms, for each of the three periods October-March, April-September and the year is shown in tabular and graphical forms, including latitudinal and vertical cross sections. (Auth. mod.)

I-31648

Bodhaine, B.A., **Aerosol measurements at four background sites,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,753-10,768, Refs. p.10,766-10,768.

DLC QC11.J6

Atmospheric monitoring stations are operated at Barrow, Alaska; Mauna Loa, Hawaii; American Samoa; and South Pole by the Geophysical Monitoring for Climatic Change program to measure the characteristics of gaseous and aerosol species under background conditions. A nearly continuous record of light-scattering coefficient and condensation nuclei concentration measurements is available for Barrow since 1971, Mauna Loa since 1974, Samoa since 1977, and South Pole since 1974. The South Pole light-scattering data show a complicated annual cycle with a maximum in the austral summer and a minimum about April. The austral winter is dominated by events most likely caused by the transport of sea salt in the troposphere from the coastal regions to the interior of the antarctic continent. The South Pole condensation nuclei data show a repeatable annual cycle with a maximum in the austral summer and a minimum in the austral winter. Linear least squares trend analyses show no significant trend compared to the standard error about the regression line at any station. (Auth. mod.)

I-31649

Cleveland, W.S., Freeny, A.E., Graedel, T.E., **Seasonal components of atmospheric CO2: information from new approaches to the decomposition of seasonal time series,** *Journal of geophysical research,* Dec. 20, 1983 88(C15), p.10,934-10,946, Refs. p.10,945-10,946.

DLC QC811.J6

CO2 concentration data in the atmosphere are widely known to possess a seasonal cycle, largely due to plant photosynthesis and respiration, superimposed upon an upward trend that is largely due to increasing fossil fuel use. In this paper we assess the information contained in the seasonal component of atmospheric CO2 data by applying modern techniques of time series decomposition to monthly average CO2 observations at three locations. At Mauna Loa and South Pole, which have the longest time series, the amplitudes of the seasonal components are found to be increasing with time, from 5.6 ppm in 1958 to 6.2 ppm in 1978 at Mauna Loa and from 10 ppm in 1965 to 1.3 ppm in 1978 at the South Pole. We consider four possible causes of the CO2 seasonal behavior—changes in the seasonal pattern of fossil fuel use, increasing vegetation, increasing global photosynthetic activity, and changes in ocean temperature—and conclude that it is most likely that the CO2 seasonal behavior reflects an increase in global photosynthetic activity. (Auth.)

I-31650

Lysakov, E.P., **Role of atmospheric circulation in the process of formation of the Weddell polynya** [K voprosu o roli atmosfernoĭ tsirkuliatsii v protsesse formirovaniia polyn'i Ueddella], *Antarktika; doklady komissii,* 1985 No.24, p.5-11, In Russian. 8 refs.

Comparison of data on atmospheric processes over the Atlantic sector of the Antarctic, collected between 1971 and 1979, and satellite information on changes in the sea ice along the Maude Rise, shows a relationship between atmospheric conditions and formation of polynyas in the area.

I-31651

Gaĭgerov, S.S., Zhorova, E.D., Kalikhman, M.IA., Fedorov, V.V., Shlenskova, N.A., **Springtime changes of the upper atmosphere circulation in the Antarctic** [Vesennie perestroĭki tsirkuliatsii verkhneĭ atmosfery Antarktiki], *Antarktika; doklady komissii,* 1985 No.24, p.12-21, In Russian. 11 refs.

Study at Molodezhnaya Station of high-pressure development and southward motion from subtropical regions, in relation to the position of a high temperature and high ozone content belt, shows that springtime circulation changes occur initially in the upper mesosphere, developing in the upper stratosphere sometimes a month later.

I-31652

Fedorov, V.V., **Optimal presentation of temperature profiles in the stratosphere and mesosphere of the Southern Hemisphere** [K voprosu ob optimal'nom predstavlenii vertikal'nykh profileĭ temperatury v stratosfere i mezosfere iuzhnogo polushariia], *Antarktika; doklady komissii,* 1985 No.24, p.22-28, In Russian. 7 refs.

Summer and winter vectors of vertical temperature profiles for Kerguelen Is. and Molodezhnaya Station are shown and discussed, as are the orthogonal temperature function calculations based on data from the same source.

I-31653

Koshel'kov, IU.P., Kovshova, E.N., **Mean charts of geopotential for the lower thermosphere of the Southern Hemisphere** [Srednie karty baricheskoĭ topografii dlia nizhneĭ termosfery iuzhnogo polushariia], *Antarktika; doklady komissii,* 1985 No.24, p.29-42, In Russian. 3 refs.

Satellite measurements with a pressure-modulated radiometer for 1975-1978, and pressure distribution in the Southern Hemisphere are discussed. The relative geopotential height of 0.1-0.004 and 0.1-0.001 mb layers is calculated from data on atmospheric emissions in the mesopause, and month-by-month charts are shown.

I-31669

Muradov, G.M., Zablotskiĭ, F.D., Koblents, IA.P., Kulish, L.A., **New stage in antarctic exploration** [Novyĭ etap v osvoenii Antarktidy], *Geodeziia i kartografiia,* Jan. 1985 No.1, p.45-49, In Russian. 11 refs.

Soviet antarctic expeditions and their contributions to antarctic geographic and meteorological data, as recorded at the Soviet antarctic stations, are reviewed. Station coordinates and summer and winter weather conditions are tabulated.

I-31689

Venne, D.E., **Horizontal structure of traveling planetary-scale waves in the upper stratosphere,** *Journal of geophysical research,* Apr. 20, 1985 90(D2), p.3869-3879, Refs. p.3878-3879.

The temperature amplitude and phase structures of zonally propagating planetary waves are determined between 79S and 79N latitudes at 10 and 1 mbar levels through the use of spectral analysis and complex-valued empirical orthogonal function analysis. The data are temperatures regressed from Nimbus 4 and 5 satellite infrared radiances during the solsticial seasons of 1970-1974. The structures of three westward moving normal modes and two eastward moving modes linked to instabilities near the winter stratopause are described. Waves of zonal wavenumber 4, 5, and 6 which are eastward moving in the summer Southern Hemisphere are also observed; a wave 1, 16-day period, westward moving mode commonly observed in geopotential fields is not seen here. The results concur with recent studies of traveling waves and provide estimates of average wave temperature amplitudes in the upper stratosphere. (Auth.)

I-31709

Zillman, J.W., Johnson, D.R., **Thermally-forced mean mass circulations in the Southern Hemisphere,** *Tellus,* Jan. 1985 37A(1), p.56-76, 52 refs.

The three-dimensional distribution of the thermally-forced time-averaged horizontal mass transport in isentropic coordinates is determined. The model, based on the time-averaged isentropic continuity equation, treats horizontal mass transport, mass transport potential, and Southern Hemisphere heating fields. The results highlight the role of radiative cooling over the cold elevated Antarctic ice cap, sensible heat flux from the warm circumpolar ocean and, in particular, the zonal and meridional contrasts of latent heat release in forcing large-scale mean mass circulations in the Southern Hemisphere. The inferred mass circulations include strong meridional and zonal components in the tropical belt extending into the middle and high latitudes of the Southern Hemisphere. Of particular interest is a large toroidal mass circulation cell transporting heat away from the heavy rainfall belt lying southeast from Papua-New Guinea. (Auth. mod.)

I-31739

Workshop on Paleoclimatic research and models, Brussels, December 15-17, 1982, Ghazi, A., ed, **Paleoclimatic research and models,** Dordrecht, D. Reidel, 1983, 205p., Refs. passim. For selected papers see 39-3145 through 39-3150 or F-31741, I-31740 and I-31742.

DLC QC884.P34

About 35 paleoclimatologists from 10 countries participated in the workshop to discuss and identify abrupt climate changes, initiation of glaciation, and glaciated polar regions and their impact on global climate. This volume contains the outcome of the workshop in the form of full texts or summaries of the presentations, three of which deal with Antarctica.

I-31740

Flohn, H., **Actual paleoclimatic problems from a climatologist's viewpoint,** Paleoclimatic research and models: report and proceedings of the workshop held in Brussels, December 15-17, 1982. Edited by A. Ghazi, Dordrecht, D. Reidel, 1983, p.17-33, Refs. p.27-29.

DLC QC884.P34

Reviewed are the Little Ice Age, the Late Glacial and Early Holocene, the building and decay of the Last Glacial, the Last Interglacial, and the ice-free Arctic versus glaciated Antarctic in the late Cenozoic. The essential paleoclimatic facts are summarized. Some examples from the transition from Late-Glacial to Early-Holocene are discussed as of possible use for further research.

I-31742

Hills, T.S., **Sensitivity of general circulation models,** Paleoclimatic research and models: report and proceedings of the workshop held in Brussels, December 15-17, 1982. Edited by A. Ghazi, Dordrecht, D. Reidel, 1983, p.181-192, 6 refs.

DLC QC884.P34

A number of experiments with atmospheric general circulation models to investigate the effect on the modelled atmosphere of changing the prescribed sea-ice cover are reviewed. The Simmonds (1979) experiment using a model of the Southern Hemisphere, run using mean September ice conditions and repeating the integration using March ice conditions instead, is confirmed by an experiment where July to September of one annual cycle integration with a 5-level general circulation model was repeated with antarctic sea ice removed north of 60 S.

I-31743

University of East Anglia, Climatic Research Unit, **Climate monitor, Vol. 13, No.5, Annual 1984,** Norwich, UK, [1985], 29p.

In this booklet major climate events in numerous countries throughout the world are summarized and an article is included predicting that global increases in carbon dioxide will continue, resulting in additional atmospheric warming during the next few decades. Data for Antarctica for 1984 include Southern Hemisphere 500 mb anomalies for May, surface temperature anomalies on the continent, and the 1957-1980 mean annual temperature, the 1984 value, and the 1984 anomaly at 26 antarctic stations.

See also:
A-29239 A-30806 A-31031 A-31399 A-31429 B-29796
B-30154 B-30291 B-30693 B-30833 C-30408 D-31154 E-29079
E-29414 E-29415 E-29588 E-29635 E-29695 E-30228 E-30233
E-30241 E-30246 E-30451 E-30522 E-30523 E-30524 E-30625
E-30925 E-30928 E-30996 E-31294 E-31432 E-31433 F-29234
F-29271 F-29361 F-29417 F-29420 F-29421 F-29433 F-29450
F-29494 F-29496 F-29705 F-29803 F-29817 F-29820 F-29825
F-29844 F-29849 F-29863 F-29876 F-29919 F-29962 F-29973
F-29974 F-30023 F-30026 F-30027 F-30040 F-30103 F-30356
F-30375 F-30405 F-30407 F-30450 F-30485 F-30569 F-30570
F-30715 F-30830 F-30831 F-30931 F-31044 F-31103 F-31106
F-31110 F-31139 F-31496 F-31646 F-31647 F-31710 F-31720
F-31721 F-31741 G-29002 G-30348 G-31516 G-31517
G-31518 G-31521 G-31554 G-31555 J-29283 J-29963 J-30091
J-30183 J-30201 J-30268 J-30741 J-30742 J-30743 J-30848
J-31079 J-31093 J-31431 K-28998 K-30312 K-30377 K-30638

J. OCEANOGRAPHY

J-28975

Arzhanova, N.V., **Si/P ratio as indicator of the mixing zone around the South Orkney Islands and the Antarctic Peninsula** [Otnoshenie soderzhaniia kremniia i fosfora (Si/P) kak pokazatel' zony smesheniia vod v oblasti IUzhnykh Orkneĭskikh ostrovov i Antarkticheskogo poluostrova], *Antarktika; doklady komissii,* 1982 No.21, p.95-100, In Russian. 17 refs.

Principles of distribution and ratio of silicon and phosphorus (Si/P) contents, and their determining factors, were studied in the Atlantic and the Pacific sections of the antarctic ocean. It is found that the Antarctic Circumpolar Current and high latitude modifications sharply differ in vertical and spatial Si/P distribution. A constant criterion of 20 to 30-35 Si/P was found in the mixing zone which corresponds to the maximum horizontal Si/P gradient. The distribution of Si/P content accurately reflects the basic configuration line of the mixing zone, allowing to evaluate water conditions in relation to bioproductivity.

J-28993

Fröhlich, F., **Paleogene and late Cretaceous pelagic sedimentary sequence of the Kerguelen plateau: preliminary results of the MD 35/D.R.A.K.A.R. cruise aboard the *Marion Dufresne* (March 1983)** [Mise en évidence d'une série sédimentaire pélagique du Paléogène et du Crétacé Supérieur sur le plateau de Kerguelen: résultats préliminaires de la campagne océanographique MD 35/D.R.A.K.A.R. (mars 1983) du N.O. *Marion Dufresne*], *Académie des sciences, Paris. Comptes rendus hebdomadaires des séances. Série 2,* Sept. 19, 1983 297(2), p.153-156, In French with English summary. 7 refs.

The sedimentary basin of the Kerguelen-Heard plateau was sampled during the *Marion Dufresne* cruise MD35. As seen on seismic profiles, it consists of two distinct units. In the lower unit, chalks, calcareous oozes, pelagic limestones with flints and cherts were cored and dredged. The top age of this unit is middle Eocene, the oldest sediments cored being of late Cretaceous age. Only the top of the upper unit, nannos and Forams oozes and diatomites, were cored, Miocene to late Pleistocene in age. Older calcareous oozes (late Eocene to early Oligocene) have been found near the northern boundary of the ridge. Therefore, the sedimentary sequence from the Kerguelen ridge appears to have an oceanic origin, and was initiated at least at the beginning of the late Cretaceous, just after the opening of the Indian ocean. (Auth.)

J-28994

Brake, C.F., Anderson, J.B., **Bathymetry of the North Victoria Land continental margin,** *Marine geodesy,* 1983 6(2), p.139-147, 17 refs.

The very unique continental margin of North Victoria Land is characterized by complex bathymetry, reflecting control by glacial, tectonic, and marine processes. The abnormally shallow shelf can be divided into a deep, rugged, glacially dominated inner shelf and a smoother, shallower outer shelf, which is dominated by marine and glacial marine processes. Deep u-shaped glacial troughs incise the shelf, while relict v-shaped canyons incise the upper slope. Trending northwest-southeast along the eastern edge of the area lies a rugged chain of seamounts representing the southern extension of the Balleny Fracture Zone. The continental slope is dominated by strong contour currents and gravity processes. (Auth.)

J-29036

Capurro, L.R.A., **Physical features of the southwestern Atlantic** [Características físicas del Atlántico Sudoccidental], Atlas del zooplancton del Atlántico Sudoccidental y métodos de trabajo con el zooplancton marino. Edited by D. Boltovskoy, Mar del Plata, Instituto Nacional de Investigación y Desarrollo Pesquero, 1981, p.219-225, In Spanish.

DLC QL123.A84

A general description is given of the southwestern Atlantic physical environment and water characteristics. The areas described are the continental margin, shelf, slope and rise, with mention of the abyssal plains of the Weddell Sea, among others.

J-29037

Boltovskoy, E., **Water masses in the southwestern Atlantic** [Masas de agua en el Atlántico Sudoccidental], Atlas del zooplancton del Atlántico Sudoccidental y métodos de trabajo con el zooplancton marino. Edited by D. Boltovskoy, Mar del Plata, Instituto Nacional de Investigación y Desarrollo Pesquero, 1981, p.227-237, In Spanish.

DLC QL123.A84

Features of antarctic surface waters are described, covering the area between the continent and the Antarctic Convergence. The mean position of the latter is reviewed, based on published data.

J-29058

Zalogin, B.S., **Ocean for man** [Okean cheloveku], Moscow, Mysl', 1983, 205p., In Russian. Refs. p.202-205.

In section 2, chapter 4 (p.138-142) the hydrological and meteorological characteristics and the geographic position of the Antarctic are described. Their economic significance is examined in the light of the biological and mineral resources found in the polar waters themselves as well as on the land they surround.

J-29082

Dubinets, G.A., Fesiumov, O.E., Trofimov, M.N., **Main geomorphological characteristics of the Sodruzhestvo Sea bottom** [Osnovnye cherty geomorfologii dna v raĭone moria Sodruzhestva], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.7-19, In Russian with English summary. 9 refs.

Based on hydroacoustic data and observations at geological stations a brief structural-geomorphological analysis of the Antarctic shelf and continental slope is made. Exploration and fishing conditions of various morphological structures are discussed. The underwater Antarctic margin, with a deep cleft relief of the continental slope and some seamounts with relatively shallow peaks, are very likely to be promising fishing areas. (Auth.)

J-29089

Popkov, V.V., **Position of frontal zones and distribution of krill clusters in the Pacific sector of the Antarctic** [Polozhenie frontal'nykh zon i raspredelenie skopleniĭ krilia v Tikhookeanskom sektore Antarktiki], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.66-73, In Russian with English summary. 26 refs.

The position of the South Polar Front and Antarctic Divergence is reviewed on the basis of data obtained at hydrological stations in the summer (January-March) of 1970-1977. The position of the South Polar Front is outlined from peculiarities of the vertical structure of water in the 0-1000 m layer. It is fairly stable and is not subject to annual fluctuations. The Antarctic Divergence is outlined on the basis of the distribution of temperature and salinity at 23 meridional transects extending from 60 S to the Antarctic coast. It is shown that there are two zones of upwelling in the area. The first, observed only in the west part of the Pacific sector over the South Pacific Ridge, is formed by cyclonic eddies; the second, observed in the entire Pacific Antarctic in the vicinity of the Antarctic continental slope, is caused by the meridional component of the east drift.

J-29090

Maslennikov, V.V., Soliankin, E.V., Spiridonov, V.A., Sysoeva, M.V., **Investigation of origin of *Euphausia superba* Dana specimens off South Georgia** [K issledovaniiu proiskhozhdeniia osobeĭ *Euphausia superba* Dana, vstrechaiushchikhsia v raĭone o-va IUzhnaia Georgiia], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.74-85, In Russian with English summary. 11 refs.

The distribution patterns of various size groups of *E. superba* with regard to the water structure off South Georgia was studied in February 1975 and in May and March 1981. Charts of horizontal circulation of water are compiled on the basis of data obtained in oceanographic surveys and the corresponding distribution of various modifications of antarctic water is analyzed. The size frequency distribution of *E. superba* is considered in the same time intervals. It is shown that two pairs of krill groups occur off South Georgia and in the southern Scotia Sea which are associated with two different water masses, the Weddell Sea and The Antarctic Circumpolar Current. (Auth.)

J-29092

Poluiaktov, V.F., Soliankin, E.V., Khvatskiĭ, N.V., Khomutov, A.V., **Hydrological conditions as factors responsible for krill distribution in the southern section of the Bransfield Strait** [Osobennosti gidrologicheskikh usloviĭ kak faktorov raspredeleniia krilia v iugo-vostochnoĭ chasti proliva Bransfild], Antarkticheskiĭ kril'. Osobennosti raspredeleniia i sreda. Edited by T.G. Liubimova, R.R. Makarov, and E.A. Kamenskaia, Moscow, Legkaia i Pishchevaia Promyshlennost', 1983, p.99-102, In Russian with English summary. 3 refs.

Based on observations made in the southeastern part of the Bransfield Strait, a chart of geostrophic currents is presented. The field is associated with the distribution of temperature in the surface layer and such hydrochemical characteristics as the content of silicates, phosphates and the Si/P ratio. Inflow of Weddell Sea water to the shelf of the Antarctic Peninsula was found in the surface water circulation field. The aggregations of *E. superba* encountered on the shelf of D'Urville Island were associated with a local eddy in the flow of Weddell Sea water. (Auth.)

J-29113

Nagao, T., Kaminuma, K., **Heat flow measurements in Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.18-26, 16 refs.

Five heat flow measurements were made during the winter season of the 22nd Japanese Antarctic Research Expedition in the Lützow-Holm Bay, Antarctica. The apparatus used for the temperature measurements was a 1.2 m long Bullard type probe with three thermistors. Temperature gradients were determined at five different sites in shallow waters on the shore fast sea ice in November 1981. The temperature data were corrected following Bullard's method. The thermal conductivities were determined on sediment samples recovered by coring before the temperature measurements were made. Since these measurements were made in shallow water, the effects of the sea floor topography and the water temperature variation were considered. The topographic effect was computed by a two-dimensional relaxation method. Because the sea floor temperature in November is increasing, the temperature gradient of sediments has a tendency to decrease. (Auth. mod.)

J-29130

Moriwaki, K., Yoshida, Y., **Submarine topography of Lützow-Holm Bay, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.247-258, 20 refs.

The huge depression of the central part of Lützow-Holm Bay is the drowned glacial trough extending from the Shirase Glacier. This trough and another off the Telen Glacier were formed probably by glaciation along faults. The sea floor of Lützow-Holm Bay is divided into the eastern and the western parts by the central trough. The greater part of the western sea floor is 300 m deeper than the northeastern sea floor. This difference in depth was caused probably by faulting. Many drowned glacial troughs exist in the eastern part. They were eroded selectively by ice streams conformably with the strike of gneissic foliation of bedrock. Rows of circular depressions seem to have been formed also along the strike of foliation by the plucking of the ice sheet. Cross profiles of troughs indicate the possibility of occurrence of multiple glaciations. Directions of troughs are different from those of glacial striae in coastal ice-free areas, and this seems to indicate that part of lower ice in troughs flowed in the different direction from the upper part of the ice sheet. (Auth.)

J-29191

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **First Post-FIBEX Hydrographic Data Interpretation Workshop,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1982 No.30, 11p., 1 ref.

Described are: events leading to the formation of this Workshop; the Oceanographic Database and Data Handling System; their introduction to the Workshop participants; the analytical procedure adopted by the Workshop; and the hydrology of the Bransfield Strait area during FIBEX. Three figures, showing water classes in the Bransfield Strait, its relative dynamic topography at the 100 dbar surface and at the 200 dbar surface during FIBEX, are presented. The following recommendations are endorsed by the participants: 1. A second Hydrography Workshop should be held as soon as possible. 2. A hydrographer should be present at all biological workshops and meetings to discuss the implications of hydrographic phenomena. 3. Further studies should be carried out in the Bransfield Strait area, where high concentrations of krill appear to be correlated with distinctive hydrographic phenomena. 4. A list of standard hydrographic stations should be adopted to establish seasonal and annual trends and to provide the necessary environmental data record for an understanding of krill distribution dynamics.

J-29192

SCAR/SCOR/IABO/ACMRR Group of Specialists on Southern Ocean Ecosystems and their Living Resources, **Second Post-FIBEX Hydrographic Data Interpretation Workshop,** *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series,* 1983 No.31, 26p., 3 refs.

The geopotential topography of the Bransfield Strait is reviewed, confirming the findings of the First Workshop and adding new data. The water classes of the area are described, as is the position of the Weddell—Scotia Confluence. Hydrographic stratification and krill aggregation data are analyzed. Twenty figures, illustrating the material covered by the Workshop, are included. The following recommendations are put forward: 1. The Argentine data should be verified from original measurements before they are included in the final BIOMASS Data Base. 2. All CTD/STD/ hydrocast profiles should be extended to the near vicinity of the bottom to permit more accurate determination of geostrophic currents. 3. The extensive manipulation required of oceanographic data should be performed by only one or two oceanographers before it is reviewed and evaluated at a full workshop meeting. 4. All physical/chemical data from FIBEX cruise should be submitted to national oceanographic data centers on completed ROSCOP/ROBI forms.

J-29203

Golubev, IU.N., Lomakin, P.D., Cherkesov, L.V., **Generation of topographic vortices and their possible effect on formation of productive zones in the ocean** [Generatsiia topografychnykh vikhoriv ta ikh mozhlyvyĭ vplyv na formuvannia produktyvnykh zon v okeani], *Akademiia nauk URSR, Kiev. Dopovidi. Seriia A Fizyko-matematychni ta tekhnichni nauky,* 1983 No.2, p.25-28, In Ukrainian with English summary. 3 refs.

Increased biological productivity is found on the slope of the Ob bank, where a geostrophic current is created by the water motion of two contiguous eddies. The biogenic concentration is found to be inversely proportional to the acidity of sea water.

J-29209

Whitworth, T., III, **Monitoring the transport of the Antarctic Circumpolar Current at Drake Passage,** *Journal of physical oceanography,* Nov. 1983 13(11), p.2045-2057, 18 refs.

Data from an extensive moored instrument array and three hydrographic cruises are used to calculate a time series of the net transport through the upper 2500 m of the Drake Passage. The baroclinic geostrophic transport was monitored with heavily instrumented moorings at each side of the passage. Pressure gauge measurements at the northern and southern ends of the passage provided a reference speed at 500 m to adjust the relative transport. The net transport of the upper 2500 m for the 370-day record ending in January 1980 averaged 121 million cu m/s. The total transport though the entire cross-sectional area of Drake Passage is probably between 118 and 146 million cu m/s. Fluctuations in the relative transport are related to changes in latitude of the northernmost front in the passage, the Subantarctic Front. Variability of the net transport is coherent with the zonally averaged eastward wind stress. (Auth.)

J-29212

Huber, B.A., **Reports of the US-USSR Weddell Polynya Expedition October-November 1981. Volume 2, Hydrographic data,** *Columbia University. Lamont-Doherty Geological Observatory. Report,* 1983 L-DGO 83-1, c. 180 leaves, 15 refs.

The volume is composed mostly of the tabulations of hydrographic, chemical, current meter, and sound velocity data. A discussion is provided of the types of data collected, data processing techniques, instruments and methods used for collection, and data characteristics. A map is included showing locations and types of the 37 stations occupied.

J-29220

Sato, T., **5th edition of the GEBCO,** *Polar news,* Aug. 1983 No.37, p.41-44, In Japanese.

The history of the General Bathymetric Charts of the Oceans since 1899 and the international atmosphere around the start of the 5th edition of the GEBCO are reviewed. The 18 new GEBCO 1:10,000,000 sheets were completed in 1982; they include several characteristic features such as a new scheme of sheets, isobath interval of 500 m, indication of data control, adoption of bathymetric charts prepared on larger scales among others. The philosophy of bathymetric chart production is that the expertise of modern geoscience knowledge should determine the representation of isobaths. Thus the completed new GEBCO sheets reflect the concept of plate tectonics. (Auth.)

J-29227

MacAyeal, D.R., **Thermohaline circulation below the Ross Ice Shelf: a consequence of tidally induced vertical mixing and basal melting,** *Journal of geophysical research,* Jan. 20, 1984 89(C1), p.597-606, 45 refs.

The warmest water below parts of the Ross Ice Shelf resides in the lowest portion of the water column because of its high salinity. Vertical mixing caused by tidal stirring can thus induce ablation by lifting the warm but dense water into contact with the ice shelf. A numerical tidal simulation indicates that vertically well-mixed conditions predominate in the southeastern part of the sub-ice-shelf cavity where the water column thickness is small. Basal melting in this region is expected to be between 0.05 and 0.5 m/yr and will drive a thermohaline circulation having the following characteristics: high salinity shelf water (at -1.8C), formed by winter sea-ice production in the open Ross Sea, flows along the seabed toward the tidal mixing fronts below the ice shelf; and meltwater (at -2.2C), produced in the well-mixed region, flows out of the sub-ice-shelf cavity along the ice shelf bottom. Sensitivity of this ablation process to climatic change is expected to be small because high salinity shelf water is constrained to have the sea-surface freezing temperature. (Auth.)

J-29228

MacAyeal, D.R., **Numerical simulations of the Ross Sea tides,** *Journal of geophysical research,* Jan. 20, 1984 89(C1), p.607-615, 49 refs.

Tidal currents below the floating Ross Ice shelf are reconstructed by using a numerical tidal model. They are predominantly diurnal, achieve maximum strength in regions near where the ice shelf runs aground, and are significantly enhanced by topographic Rossby wave propagation along the ice front. A comparison with observations of the vertical motion of the ice shelf surface indicates that the model reproduces the diurnal tidal characteristics within 20%. Similar agreement for the relatively weak semi-diurnal tides was not obtained, and this calls attention to possible errors of the open boundary forcing obtained from global-ocean tidal simulations and to possible errors in mapping zones of ice shelf grounding. Air-sea contact below the ice shelf is eliminated by the thick ice cover. The dominant sub-ice-shelf circulation may thus be tidally induced. A preliminary assessment of sub-ice-shelf conditions based on the numerical tidal simulations suggests that (1) strong barotropic circulation is driven along the ice front and (2) tidal fronts may form in the sub-ice-shelf cavity where the water column is thin and where the buoyancy input is weak. (Auth.)

J-29229

Gordon, A.L., Chen, C.T.A., Metcalf, W.G., **Winter mixed layer entrainment of Weddell Deep Water,** *Journal of geophysical research,* Jan. 20, 1984 89(C1), p.637-640, 26 refs.

Observations show that the mixed layer below the sea ice just prior to the austral spring retreat in the 60 deg S Greenwich meridian region has an oxygen content of 7.4 ml/l. The source of this deficit is believed to be a consequence of oxygen-poor (4.5 ml/l) Weddell Deep Water (WDW) entrainment by the winter mixed layer. A mixing ratio of 1:3 for WDW to "beginning of winter" surface water is required to explain the end-of-winter mixed-layer oxygen content. Accompanying the WDW transfer into the mixed layer is heat transfer of approximately 7000 cal/ sq cm as well as salt transfer, which requires 34 cm of fresh water to produce typical mixed-layer salinity. A mean annual heat flux of 12 W/sq m is suggested, with an annual demand for freshwater of 46 cm/yr. The remaining freshwater is derived from excess precipitation and possibly iceberg melt. Oxygen undersaturation of the winter surface water suggests slightly less potential for abyssal water ventilation than might be expected from a fully saturated condition. (Auth. mod.)

J-29230

Gordon, A.L., Huber, B.A., **Thermohaline stratification below the southern ocean sea ice,** *Journal of geophysical research,* Jan. 20, 1984 89(C1), p.641-648, 28 refs.

The temperature maximum of the Weddell Deep Water (WDW) is, for the most part, less than 0.5C, but warmer cells of WDW are found. These warm WDW cells have temperature, salinity, and oxygen properties similar to the WDW characteristic of the Weddell gyre inflow. The warm WDW cells are accompanied by domes in the pycnocline of 40 m amplitude over the surrounding pycnocline, while deeper isopycnals are depressed. The pycnocline domes are exposed to about 50% greater entrainment by the turbulently active winter mixed layer, relative to the regional entrainment rate. This entrainment can significantly erode the warm cells in a single winter season, introducing excess heat and salt into the mixed layer. It is hypothesized that the warm WDW cells within the Weddell gyre trough are derived from instability within the frontal zone which extends from Maud Rise to the northeast, separating the Weddell warm regime from the cold regime. Greater than normal injection of warm WDW cells into the Weddell gyre trough would increase the surface salinity, which would tend to destabilize the pycnocline, increasing the probability of deep convection and polynya events. (Auth. mod.)

J-29273

Ono, N., Motoi, T., **Some characteristics of summer ocean structure off the Queen Maud Land, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Nov. 1983 Special Issue No.29, Symposium on Polar Meteorology and Glaciology, 5th, 1982. Proceedings. Edited by K. Kusunoki, p.127-134, 5 refs.

The hydrographic data of *Fuji* obtained where the Weddell polynya appeared during the winters of 1973-1977, are examined for finding out the influence of a winter polynya on summer ocean structure. Vertical profiles of temperature, salinity and sigma-t at station 75-7 on February 26, 1975, for the JARE-16 show the absence of water below 0 C, both the weak minimum and the weak maximum temperature profile, a high-salinity water at the depth where the temperature is minimum, and a shallow pycnocline. These features, which reveal the upward movement of saline water, are different from the anomalous features at station 115 of the cruise of the *Islas Orcadas,* where sinking of the cooled surface water occurred. The same features as the profiles at stations 75-7 and 115 are found at stations 118 and 125 respectively in the *Islas Orcadas* data. These four stations were located near the margin of the polynya in the preceding winter, and both types of anomalous features reveal that strong convection, which occurred locally in the polynya area in the preceding winter, influences summer ocean structure. (Auth. mod.)

J-29283

Dera, J., **Oceanographic investigation of the Ezcurra Inlet during the 2nd Antarctic Expedition of the Polish Academy of Sciences (PAS),** *Oceanologia,* 1980 No.12, p.5-27, With Polish summary.

This report is a preliminary presentation of the characteristic features of the Ezcurra Inlet on King George Island. The parameters considered are meteorological conditions, ice confluence, currents and tides, water salinity and temperature, concentration of oxygen and nutrients, suspensions and water transparency, underwater visibility, solar radiation and underwater lightfield, pigments, phytoplankton and primary production, and zooplankton and its bioluminescence.

J-29313

Osborn, N.I., Ciesielski, P.F., Ledbetter, M.T., **Disconformities and paleoceanography in the southeast Indian Ocean during the past 5.4 million years,** *Geological Society of America. Bulletin,* 1983 94(11), p.1345-1358, 55 refs.

Biostratigraphy and magnetostratigraphy are used to identify deep sea disconformities in the Indian Ocean, and increased bottom-water and deep sea circulation patterns. The causes of increased bottom-water activity may be correlated with paleoclimatic events. Southern ocean cooling and the proposed re-establishment of the West Antarctic ice sheet and its fringing ice shelves in the late Gilbert Chron (4.2 to 3.6 m.y. B.P.) were accompanied by increased Antarctic Bottom Water and Circumpolar Deep Water activity as revealed by the frequency of both shallow and deep disconformities. (Auth.)

J-29337

Naito, Y., **Antarctic marine ecosystems,** *Polar news,* Jan. 1983 No.36, p.6-11, In Japanese.

Some distinctive oceanographical aspects of the southern ocean, such as the unique current system which separates it from other oceans, are explained. The relation between these oceanographical peculiarities and the antarctic marine ecosystem is emphasized. This ecosystem is also discussed from the viewpoint of energy efficiency. The relative simple food web in the Antarctic Sea indicates that energy flows efficiently from the primary producer to the final consumers and shows that the biomass of the final consumers such as seals and whales which predominantly prey on krill is quite enormous. These high energy efficiencies do not ensure the high gross production in the Antarctic Sea. In discussing the production in the southern ocean, both the energy efficiency of the food web and the production rate should be taken into consideration. A recent BIOMASS study confirms these concepts although the winter season data that is essential in the evaluation of production rate is quite limited. (Auth.)

J-29338

Ishino, J., **Scientific results of antarctic ocean survey (Physical oceanography),** *Polar news,* Jan. 1983 No.36, p.12-16, In Japanese.

During the past twenty-five years, there has been an enormous increase of the oceanographic knowledge concerning the antarctic circumpolar waters. This has been mainly due to an increase in research activities and to the remarkable development of instrumentation such as inductive salinometer, CTD (STD), XBT and drifting and/or moored buoy systems. Application of satellite techniques have also made it easier to fix a ship's position as well as to gather information concerning synoptic oceanographic conditions. Japanese research vessels; such as *Umitaka, Fuji* and *Kaiyo,* made many cruises during this period providing valuable contributions to the development of this scientific knowledge. Currents and circulations in the southern ocean were frequently surveyed in considerable detail. The Antarctic Divergence is not only a physical phenomenon in the southern region of these waters but also important for the occurrence of Antarctic krill and Japanese oceanographers took much interest in it. Some observations were conducted in the sea ice-covered region, and the measurements of water movement by using current meters at stations in the vicinity of Antarctica were made. (Auth. mod.)

J-29376

Kuramoto, S., Koyama, K., **Preliminary report of the oceanographic observation in the 22nd Japanese Antarctic Research Expedition (1980-1981),** *National Institute of Polar Research, Tokyo. Memoirs,* Oct. 1982 Special issue No.23, Proceedings of the Fifth Symposium on Antarctic Biology, edited by T. Hoshiai and Y. Naito, p.5-12, 5 refs.

This report presents the preliminary results of the oceanographic observations, which were carried out in the 22nd Japanese Antarctic Research Expedition in 1980-1981. The oceanographic sections across the Antarctic are given for the two legs, southbound and northbound. For the southbound leg, observations of the surface layer are given. For the northbound leg, the results of serial observations are presented along with the analysis of the geostrophic volume transports. The results of continuous measurements at two fixed stations near Showa Station are also given. (Auth.)

J-29428

Zotikov, I.A., Zagorodnov, V.S., **Thermal conditions of the Ross Sea under the Ross Ice Shelf** [Teplovoĭ rezhim moria Rossa pod shel'fovym lednikom Rossa], *Antarktika; doklady komissii,* 1980 No.19, p.167-172, In Russian. 4 refs.

Temperatures of water masses under the Ross Ice Shelf, measured by a highly sensitive quartz thermometer, are reported. The data show two nonuniform, isothermal water layers. Subglacial currents were located and their speed was measured. Thermal fluxes, regulating the thawing and freezing processes under the lower surface of the shelf, are studied. Plans for future studies in the same area, using underwater soundings, are outlined.

J-29438

Rama Raju, D.V., Somayajulu, Y.K., **Some physical characteristics of the Antarctic and western Indian Oceans,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.53-61, 6 refs.

Expendable bathythermograph (XBT) and hydrographic observations made along the transects through Antarctic and western Indian Oceans on board M.V. *Polar Circle* during the First Indian Expedition have been analyzed and are presented in this paper. A wide north-south variation in the physical oceanographic parameters has been noticed along the transects. Maximum sea surface temperatures have been observed between latitudes 6-10 S and a sharp fall of temperature has been found near the convergence zones particularly between latitudes 40-50 S. The surface temperatures ranged between 28.7 C and -1.7 C. The depths of the isothermal (mixed) layer in the antarctic waters to the south of latitude 68 S extend to 200-400 m while at other regions they are found to be within 100 m. The data clearly shows that a convergence process is taking place around 60 S with the antarctic surface water slipping below and mixing with the subantarctic surface water. T-S analysis shows characteristic changes in T-S relations of antarctic intermediate water as the distance from the Antarctic Convergence increases. (Auth.)

J-29440

Sen Gupta, R., Qasim, S.Z., **Chemical oceanographic studies along a section from 32 S to Antarctica in the southwestern Indian Ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.69-77, 18 refs.

Water samples collected during the First Indian Expedition to Antarctica, were analyzed for salinity, dissolved oxygen, pH, phosphate-phosphorus, nitrate-nitrogen, nitrite-nitrogen and silicate-silicon. These parameters were used to identify the regions of Polar Divergence, Antarctic Convergence and sub-tropical convergence. Downward gliding of the nutrient-rich water along the continental slope of Antarctica was also recorded. The atomic ratios of the change in Apparent Oxygen Utilization:Si:N:P were 285:58:19:1. A comparison of these with similar ratios from the northern Indian Ocean indicates an excess of 19% nitrate and 45% silicate in the southern Indian Ocean while the phosphate concentrations in both these seas were found to be quite similar. "Reserved" fractions of phosphate and nitrate decreased significantly from the antarctic to the subantarctic waters. This indicates that there is an increase in the intensity of oxidation process in these areas. Applying an empirical relationship between the silicate and AOU, it was observed that the lower ranges of silicate concentration were due to its consumption by siliceous algae, north of the polar divergence. Negative values between the observed and the calculated values suggest a transfer of oxygen from deeper layers to intermediate layers. (Auth. mod.)

J-29441

De Souza, F.P., Sen Gupta, R., **On Fluoride, bromide and iodide in the southwestern Indian Ocean sector of the southern ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.78-86, 30 refs.

Seawater average fluoride concentration and fluoride/chlorinity ratio were measured. Samples of water up to a depth of 4000 m, when analyzed for fluoride, gave no indication of high concentrations and the effect of dissolution at or from the bottom was ruled out. Bromide content (average 68.08 mg/l) and chlorinity varied in a parallel manner and a rather constant Br/Cl ratio of 0.00347 was established. The iodide concentrations varied with depth, being greater in the upper and bottom layers at all stations. While fluoride and bromide mainly influenced the physical properties of seawater, the importance of iodide lay in the chemical and biological fields. (Auth.)

J-29442

Naik, S., Noronha, R.J., Shirodkar, P.V., Sen Gupta, R., **Distribution of calcium, magnesium, sulphate and boron in the southwestern Indian Ocean region of the southern ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.87-94, 20 refs.

Calcium showed distinct variations at sub-tropical convergence and Antarctic Divergence whereas magnesium, though a conservative element, did not show any regular pattern of variation. Sulphate, a biologically inactive anion, was found to be most conservative. Boron shows dissimilar pattern of variation in the Antarctic and subtropical region and varies inversely with chlorinity in the sub-tropical region. The depth variations of all these four ions are described. (Auth.)

J-29443

Sanzgiry, S., Mesquita, A., Sen Gupta, R., **Distribution of a few trace metals in a section of southwestern Indian Ocean,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.95-99, 9 refs.

Determination of Cu, Cd, Fe, Mn, Zn, Pb, Co and Ni was carried out at different depths at 8 stations—one station being in an antarctic polynya and 7 in the southern ocean. The depth and surface variations are discussed for different parts of sampling regions—antarctic polynya, Antarctic Divergence, Antarctic Convergence and subtropical convergence. Average dissolved Cu and Cd in the 100-500 m depth layer in the Antarctic region is nearly the same as the average concentrations of the two metals in the sub-tropical surface water. In general, dissolved Fe shows enrichment towards the bottom except in the Antarctic Divergence region. Particulate Fe is high in the Antarctic region. Mn concentration is almost similar in the 100-500 m layer throughout the sampling regions. Dissolved as well as particulate Zn is higher at surface and lower in the bottom layer. Pb, Co and Ni have no definite trend of variation in either dissolved or particulate forms. (Auth.)

J-29451

Siddiquie, H.N., Pathak, M.C., **Bathymetry and geomorphology of the approaches to *Dakshin Gangotri*, Princess Astrid coast, Queen Maud Land, Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.149-151, 3 refs.

The continental margin depths along the Princess Astrid Coast ranged from about 740 m at the northern edge of the ice pack (January 1982) to 224 m at the ice shelf. The route was found to be safe for navigation except for the presence of seasonal ice cover and large semi-permanent icebergs. The topography in the area is marked by a sill at about 120 m depth which separates the deeper open ocean (> 700 m) in the north and more than 200 to 700 m in the south. The position of the sill is marked by the grounding of numerous icebergs. The sill perhaps plays a significant role in the separation of water masses of the area and even in the development of polynya. (Auth.)

J-29503

Ponomarev, V.I., **Nonlinear diagnostic model of the mesoscale circulation in the zone of water confluence of Scotia and Weddell Seas** [Nelineĭnaia diagnosticheskaia model' mezomasshtabnoĭ tsirkuliatsii v zone sliianiia vod moreĭ Skosha i Ueddella], *Meteorologiia i gidrologiia,* 1983 No.11, p.68-75, In Russian with English summary. 10 refs.

A nonlinear diagnostic model of mesoscale oceanic circulation is considered. With the aid of this model, three components of current velocity in the zone of water confluence of Scotia and Weddell Seas are calculated. Peculiarities in the vertical water circulation in the frontal zone region and in mesoscale vortices are revealed. The degree and nature of the influence of nonlinear inertial forces on the baroclinic and barotropic components of horizontal velocity as well as on the vertical speed are determined. (Auth.)

J-29512

Heath, R.A., **Tidal currents in the southwestern Pacific Basin and Campbell Plateau, southeast of New Zealand,** *Deep-sea research,* Apr. 1983 30(4A), p.393-409, 13 refs.

Tidal analyses of 7 months of hourly current meter records from nine current meters and 18 months of similar records at three depths, near 49.5S, 170 W, 650 km east of the Subantarctic Slope are reported. The M2 barotropic tide has a small positive ellipticity and is consistent with a Kelvin wave progressing anticlockwise around New Zealand. There is a distinct vertical structure in the M2 ellipticity that decreases with depth and becomes negative below about 2200 m. The distinct vertical structure results from superposition on the barotropic ellipse of a baroclinic ellipse which must be approximately perpendicular to the Subantarctic Slope. The S2 tidal ellipse has minimal vertical structure and is consistent with a free wave; the distinction between the S2 and M2 tides agrees with previous analyses based on tidal observations. Analysis of 7 months of hourly current meter records from the Campbell Plateau west of the top of the Subantarctic Slope indicates strong diurnal tidal currents with the relative K1/M2 admittance of the currents increasing by a factor of 10 from the southwestern Pacific Basin to the Subantarctic Slope. The strong diurnal currents are taken as evidence for the presence of an internal continental shelf wave on the Subantarctic Slope. (Auth. mod.)

J-29589

Ledbetter, M.T., Ciesielski, P.F., Osborn, N.I., Allison, E.T., **Bottom-current erosion in the southeast Indian and southwest Pacific Oceans during the last 5.4 million years,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.379-383, 20 refs.

DLC QE350.A57 1983

Hiatus frequency in the sedimentary record in the southeast Indian Ocean during the last 5.4 Ma defines periods of increased velocity of Antarctic Bottom Water and Circumpolar Deep Water. Increases in the extent of erosion by Circumpolar Deep Water occurred in the late Gauss Chron and late Matuyama Chron. Increased Antarctic Bottom Water erosion occurred in the late Gilbert Chron with a small increase in the late Matuyama Chron. The upper Matuyama disconformity is much greater in extent than at present in both deep and shallow areas. Bottom-current erosion has waned extensively since the late Matuyama. The percent manganese micronodules increases dramatically between 3.0-4.5 Ma and at 1.2-1.3 Ma indicating a reduction in sedimentation rate associated with increased bottom-current velocity. Similarly the silt mean particle-size coarsens at the same times indicating a coarse lag deposit under high velocity currents. The periods of increased Antarctic Bottom Water velocity correspond to episodes of Antarctic cooling and expansion of ice-sheets/shelves. The sharp decrease in velocity at 3.0-3.2 Ma occurs in response to the decrease in North Atlantic Deep Water production as a result of the freezing over of the Norwegian Sea during the Northern Hemisphere Ice Ages. The widespread shallow and deep disconformities at 2.0-1.5 Ma are in response to cooling of the Ross and Weddell Seas and the steepening of the latitudinal temperature gradient. (Auth. mod.)

J-29592

Ledbetter, M.T., Ciesielski, P.F., **Bottom-current erosion in the South Atlantic sector of the southern ocean,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.390-392, 23 refs.

DLC QE350.A57 1983

The magnetostratigraphy and biostratigraphy of 61 piston cores on two traverses from Antarctica to the Agulhas Basin south of Africa reveal disconformities in the sedimentary record which are attributed to bottom-current erosion. Increased Antarctic Bottom Water production removed most sediment at the eastern end of the Weddell Basin younger than Middle Pliocene (2.5 Ma) with Miocene or older sediment exposed at or near the seafloor at some locations. Increases in the velocity of the Circumpolar Deep Water eroded Pliocene sediment on the crest and south flank of the Southwest Indian Ridge and maintains an active scour zone today with Middle Pleistocene (1.0 Ma) sediment exposed at the seafloor. (Auth.)

J-29611

Elverhöi, A., Maisey, G., **Glacial erosion and morphology of the eastern and southeastern Weddell Sea shelf,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.483-487, 20 refs.

DLC QE350.A57 1983

Sampling (38 samples) of the surface sediments in the eastern and southeastern Weddell Sea show till intermittently overlain by glaciomarine deposits, supporting the concept of Late Wisconsin grounded ice extending to the shelf edge. The 1100 m deep Crary Trough has been covered by grounded ice, indicating increased ice discharge from the Filchner Ice Shelf. Sparker data show former grounding over the entire shelf and (1) a thin (< 15 m) veneer of sediments above a well defined angular unconformity in most places, and (2) accumulations (100-400 m (two-way travel time) thick) of glaciogenic deposits in the mouth of the Crary Trough, which consist of two units, separated by an angular unconformity. The upper unit, confined to the eastern side of the Crary Trough, is unconformable with the sea floor in its western and southern part. Tentative dating of the strata unconformably underlying the glaciogenic deposits in the outermost part of the Crary Trough, indicates that grounded ice had extended to the shelf edge by the Mid/Late Tertiary period. This contrasts with the Ross Sea area where glaciers were calving at the head of the embayment. (Auth.)

J-29616

Kaminuma, K., Nagao, T., **Heat flow measurements in Lützow-Holm Bay, Antarctica—a preliminary study,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.515-518, 7 refs.

DLC QE350.A57 1983

A new technique for measuring temperature gradients on the ocean bottom under the sea ice has been developed, and has been used to measure temperatures at five observation points during the wintering in Lützow-Holm Bay in 1981. The apparatus, used for these measurements, consists of a probe, a connection receptacle, and a pressure vessel. The data from three thermistors in the probe were recorded in IC memories with three channels. The total number of samplings at each channel is 256, at either 30 second or 60 second intervals. The system accuracy of the measurement is 0.01 C, and the resolution is 0.001 C. The depths of the sea water at the measurement points are between 500 and 800 m, and the thickness of the sea ice is approximately 1.5 m. Before each measurement, a core of the sediment layer in the sea bottom was collected by a gravity corer. The thermal conductivity of the sediment was obtained from the core. The sea water temperatures at the sea bottom range from -1.30 C to -0.08 C, and those at the top layer of the sediment from -1.24 C to -0.05 C. The heat flows at the individual stations range from 0.86 to 5.43 HFU (1 HFU=0.000001 cal/sq cm/s). The high heat flow is an unexpected result in the marginal area of the East Antarctic Shield. (Auth.)

J-29650

Sarukhanian, E.N., Smirnov, N.P., **Current status and problems of southern ocean studies** [Sovremennoe sostoianie i problemy izucheniia IUzhnogo okeana], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.52-65, In Russian. 19 refs.

Results of experimental studies of the southern ocean, carried out recently by the POLEX-South and ISOS programs, are presented. Circulation systems to the north and south of the Antarctic Circumpolar Current and their role in its water mass and energy balance are discussed, as are the Current's characteristics and variability, its direction and vorticity and deep-water formation and how they affect global circulation. The problems of interaction between the antarctic ocean and the air above it are also pointed out.

J-29663

Wegner, G., **Two temperature sections through the southern Atlantic and southeastern Weddell Sea,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(4), p.239-243, In English with German summary. 6 refs.

Two temperature sections, which were made predominantly with XBT from M.V. *Polarsirkel* on the cruise toward the Filchner Ice Shelf and Atka Ice Port, 1980/81, show the characteristic thermal structure of the water masses crossed—even off the Antarctic continental ice front. The frontal areas are stressed by crowded isotherms. In the area of the Scotia Ridge and the South Sandwich Islands the isotherm courses indicate eddy or meander formation, owing to the topography. (Auth.)

J-29666

Pommeranz, T., Herrmann, C., Kühn, A., **Mouth angles of the rectangular midwater trawl (RMT1+8) during paying out and hauling,** *Deutsche wissenschaftliche Kommission für Meeresforschung, Berlin. Berichte,* 1982 29(4), p.267-274, In English with German summary. 8 refs.

About 900 tows have been made by standard RMT1+8 during 3 expeditions to Antarctic waters. In order to relate the resulting catches to volumes of water filtered it was essential to know the dependences of mouth angles on the speed of the nets through the water (V). These are known from the literature for horizontal but not for oblique towing. As, however, most of the present tows were purely oblique or had oblique phases, mouth angles to the vertical (theta) of a standard RMT1+8 were measured at different V during paying out and hauling. These theta-values were corrected for the corresponding angles of the tow path in order to obtain angles theta sub f, which determine the size of the effective mouth areas. For describing the dependences of theta sub f on V a polygon was fitted to the obtained theta sub f-values of the RMT1 and a compound curve type known from the literature for horizontal towing to the data of the RMT8. It is suggested to apply these curves correspondingly separate to horizontal and oblique tow phases. In contrast to indication from the literature the RMT1+8 was always stable during the present study and can be considered to allow reliable estimates of volumes filtered. (Auth.)

J-29734

Cort, V.G., **Meso-scale variability of the Antarctic Circumpolar Current from drifting buoy data** [Mezomasshtabnaia izmenchivost' Antarkticheskogo tsirkumpoliarnogo techeniia po dannym dreĭfuiushchikh buev], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.49-54, In Russian. 4 refs.

The most important element found in the Antarctic Circumpolar Current's (ACC) variability is its meso-scale, rather than broad-scale, occurrence. Maps and charts are presented showing buoy trajectory and number in the ACC zone, covering the period January-July 1979; the dynamics of relative surface topography (200/3000 db) in the ACC region; and geostrophic currents on the surface of Drake Passage.

J-29735

Vorob'ev, V.N., Uranov, E.N., **Statistical structure of sea level fluctuations in Alasheyev Bight in winter** [Statisticheskaia struktura kolebaniĭ urovnia moria v zalive Alasheeva zimoĭ], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.54-60, In Russian. 6 refs.

Tabulated results of investigations carried out from July to Dec. 1976 in the Molodezhnaya Station area, show small variability of amplitude and angle of the eight principal winter tidal waves. In the winter period, July to November, the maximum range of overall sea level fluctuation amounted to 150 cm, while the difference between extreme average daily levels was 56 cm.

J-29798

Le Corre, P., Minas, H.J., **Distribution and variation of nutrients in the Indian sector of the Antarctic Ocean during late summer** [Distribution et évolution des éléments nutritifs dans le secteur indien de l'Océan Antarctique en fin de période estivale], *Oceanologica acta,* Oct. 1983 6(4), p.365-381, In French with English summary. 71 refs.

Nutrient distribution (nitrate, silicate, phosphate) was obtained from a north-south transect made up of 28 stations between 40 S and 62 S, west of the Kerguelen Islands, where data on hydrography and phytoplankton growth were also collected. Different areas in the southern ocean are clearly distinguished by nutrient data, especially N/P and N/Si ratios. In the Antarctic surface waters, very high nutrient levels are generally found; thus any limitation of phytoplankton production by these elements may be ruled out. Which factor accounts for the lack of sustained algal production in these potentially rich waters is still a matter of debate. Regeneration assessment in the Antarctic intermediate water leads to the conclusion that mixing occurs between three water bodies: thermal minimum water, central water and the deep water characterized by a minimum oxygen content. A multivariate analysis performed on oxygen, salinity and nutrient data, together with a regeneration assessment, shows that the low level of oxygen results from advective phenomena rather than from a local origin. A well-marked silicate increase is found in the Antarctic bottom water and ascribed to regeneration from sediments. An increase of nitrogen is also found; however, the source of this increase remains unclear. (Auth. mod.)

J-29808

Taylor, H.W., **Some large scale aspects of the southern ocean and its environment,** New York, Columbia University, 1980, 164p., University Microfilms order No.81-05106, Ph.D. thesis. Refs. p.130-138.

The wind stress upon the sea surface at 5 x 5 deg latitude and longitude grid points is presented for the first time over the entire southern ocean. The dependent parameters of Ekman Transport, wind stress curl, upwelling velocity at the base of the Ekman layer, and Sverdrup Transport are also presented, derived here using spherical coordinates due to the high latitudes involved. The distribution of the resulting quantities is discussed and compared to many similar geographical trends of the oceanographic data. The question of cause and effect, in particular reference to the oceanic polar front, is presented. The Ekman Transport and resulting upwelling values are then put to use, in conjunction with heat budget data from other investigators, in an effort to explain the high gradients of the polar front by the local sea-air flux of heat and momentum. The expected gradients are opposite to those observed. The high gradients of the polar front zone are then a cause of the observed heat budget in that vicinity, rather than a result, and the conclusion is drawn that the surface ocean is forced on a larger scale in connection with the deep ocean, and the Antarctic Circumpolar Current (ACC). The observed coupling of the ocean bottom bathymetry with the path of the ACC and associated parameters is investigated, as is a box model for Antarctic Surface Water in which upwelling Circumpolar Deep Water and sea-air-continent fresh water sources balance the sinks of Antarctic Bottom Water and surface and near-surface polar front discharge. (Auth.)

J-29963

Loutit, T.S., **Miocene stable isotope stratigraphy and paleoceanography,** University of Rhode Island, 1981, 260p., University Microfilms order No. 83-28479, Ph.D. Thesis. Refs. p.232-260.

A series of stable isotope studies, and one quantitative study of planktonic foraminifera in deep sea sediments, provide stratigraphic and paleoceanographic information on the development of Miocene climate and ocean structure in the Pacific. Also shown are changes in thermal (vertical and latitudinal) ocean structure, probably occurring in response to the build up of a major ice-sheet on Antarctica, the intensification of bottom water circulation and an increase in zonal circulation in surface waters. (Auth.)

J-29975

Chen, C.T.A., **Carbonate chemistry of the Weddell Sea,** *U.S. Department of Energy. Report,* Mar. 1984 DOE/EV10611-4, 118p., Refs. p.99-106.

Concurrent pH, calcium and total alkalinity data were obtained in the eastern Weddell Sea in the late austral Winter of 1981 as part of the US-USSR Weddell Polynya Expedition aboard the Soviet icebreaker *Somov.* These data represent the initial concentrations of calcium, alkalinity and total CO2 in the most important source region of world ocean bottom waters at the time they were formed. For the first time we can evaluate the variation of calcium and carbon cycles in the deep oceans referenced to the source water. Our Weddell Sea data were analyzed with data reported in the literature, and the results indicate that: the October pH values south of the Polar Front are indistinguishable from the November values, but the seasonal effect is large north of the front; a large change in pH occurs at the ice edge; partial CO2 pressure in the Weddell Sea surface water is only slightly lower than the atmospheric value; the alkalinity does not show cross-ice-edge or seasonal variations, but the values seem to increase at a slower rate with decreasing temperature south of the Polar Front; sea ice is relatively high in calcium and alkalinity concentrations; mixing dominates the distribution of chemical properties; pH is useful in identifying the sources of waters in the Weddell Sea, whereas calcium and alkalinity are not. (Auth.)

J-30033

Oka, K., Fuchinoue, S., **Oceanographic data of the 23rd Japanese Antarctic Research Expedition from November 1981 to April 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.91, 38p.

The report includes the record of instrumental observations of current measurement on the cruise track, physical aspects of sea water along the track from Freemantle to Showa to Mauritius, and tidal stream observations from the fast ice near Showa Station. Additionally, chemical analyses were made for salinity, pH, dissolved oxygen, phosphate, silicate, nitrate, and ammonium. Values for these measurements are set forth in tabular form and the methods and instruments used are described.

J-30055

Treshnikov, A.F., **Present state of Soviet research on the Arctic and Antarctic oceans,** *Soviet meteorology and hydrology,* Nov. 1977 No.11, p.73-79, 12 refs. For Russian original see 32-2193, or 10J-19588.

Soviet oceanology in polar regions is reviewed from its inception and its fundamental accomplishments summarized. Special attention is given to recent work, including Russian participation in international research efforts like POLEX. A brief description of the direction in which future research will go is also offered.

J-30083

Kochergin, V.P., Shcherbakov, A.V., **Numerical modeling of baroclinic world ocean,** *Soviet meteorology and hydrology,* 1977 No.7, p.44-50, 23 refs. For Russian original see 10J-19369 or 32-1327.

A three-dimensional baroclinic model for the dynamics of the world ocean is suggested. The model is based on a difference scheme of the second order of approximation for an elliptic equation with a small parameter in senior derivatives. Fields of density and currents from arctic seas to the coasts of Antarctica are computed for winter with preset density at the area boundary. (Auth.)

J-30091

Talley, L.D., **Meridional heat transport in the Pacific Ocean,** *Journal of physical oceanography,* Feb. 1984 14(2), p.231-241, Refs. p.240-241.

The heat transported meridionally in the Pacific Ocean is calculated from the surface heat budgets of Clark and Weare and others; both budgets were based on Bunker's method with different radiation formulas. The meridional heat transport is also calculated from the surface heat budget of Esbensen and Kushnir, who used Budyko's method. The heat transport is southward at most latitudes if the numbers of Clark and of Weare are used. It is northward in the North Pacific and southward in the South Pacific if Esbensen and Kushnir's numbers are used. Systematic errors in both calculations appear to be so large that confident determination of even the sign of the heat transport in the North Pacific is not possible. The amount of heat transported poleward by all oceans is obtained from the Pacific Ocean calculation and transports in the Atlantic and Indian Oceans based on Bunker's surface heat fluxes. (Auth.)

J-30108

Bubnov, V.A., Burkov, V.A., Grachev, IU.M., Koshliakov, M.N., **Quasi-stationary cyclonic eddy in the Antarctic Circumpolar Current south of Africa** [Kvazistatsionarnyĭ tsiklonicheskiĭ vikhr' v Antarkticheskom tsirkumpoliarnom techenii k iugu ot Afriki], *Akademiia nauk SSSR. Doklady,* 1984 275(3), p.737-740, In Russian. 4 refs.

Eddy velocity measurements, carried out between latitudes 40 and 52 S, showed the following values: 45 to 55 cm/s at 300 m depth, and 35 to 45 cm/s at 1700 m, for the southern half of the eddy; 65 cm/s at 300 m and 45 cm/s at 1700 m, for the northern half. It is concluded that ocean eddies similar to the one described, as well as transient ones, are largely responsible for the meridional heat exchange across the antarctic front indispensable for the compensation of the yearly loss of heat, from the ocean into the air above it, in regions adjoining the Antarctic.

J-30120

Stepanov, V.N., **Salinity field and its vertical restructuring in the world ocean,** *Soviet meteorology and hydrology,* 1977 No.10, p.70-73, 5 refs. For Russian original see 10J-19589.

Charts are shown giving salinity fields for surface, mid-level and deep waters from the Arctic to the Antarctic. Based on new data these maps greatly refine earlier concepts of salinity field structure.

J-30169

Miller, D.G.M., **Hydrology of water close to Gough Island,** *South African journal of antarctic research,* 1982 Vol.12, p.23-33, With Afrikaans summary. 32 refs.

Water samples were collected from 32 stations close to Gough Island. Temperature and salinity values indicate that the waters sampled were essentially sub-antarctic in character. Distribution of the major elements of the water column were relatively uniform both horizontally and vertically. This would suggest that considerable mixing of surface waters was taking place probably as a result of prevailing weather conditions in the region. Chlorophyll *a*, phosphate, nitrate, and silicate ranges were low but still directly comparable with available data for the area. However, indications are that water properties may be influenced both by variations in the position of the subtropical convergence and by possible topographical effects of the island itself. (Auth.)

J-30176

Tanabe, S., Tatsukawa, R., **Vertical transport and residence time of chlorinated hydrocarbons in the open ocean water column,** *Oceanographical Society of Japan. Journal,* Apr. 1983 39(2), p.53-62, 22 refs.

The vertical transport of PCBs and chlorinated hydrocarbon pesticides such as DDT compounds and HCH (BHC) isomers in the deep sea are discussed on the basis of their vertical profiles and the proportion of their adsorbed and dissolved fractions in surface water surveyed in the western Pacific, eastern Indian and antarctic oceans. The percentages of chlorinated hydrocarbons adsorbed on suspended solids in surface water increased towards the high latitude locations, and the percentage seemed to be proportional to the concentration of suspended solids in the surface water. This implies that the residence time of chlorinated hydrocarbons in the water column will differ significantly among oceans that differ in primary productivity. The shortest value, only 11 to 19 days, was estimated for DDE+DDT in the antarctic ocean. (Auth.)

J-30182

Ivanov, IU.A., Krasnopevtsev, A.IU., Morozov, E.G., Shadrin, I.F., Shcherbinin, A.D., **Evolution of cyclonic rings in the Antarctic** [Osobennosti evoliutsii tsiklonicheskogo ringa v Antarktike], *Akademiia nauk SSSR. Doklady,* 1984 275(4), p.1012-1015, In Russian. 4 refs.

Surface and bathymetric measurements, hydrochemical determinations and biological investigations are discussed in this report of a study of cyclonic ring evolution in the Antarctic. Temperature profiles show two cyclonic positions, and the eddy is described as the carrier of entrapped cold water. The incline of isothermal surfaces shows values of 0.04 at the cyclone's edge; the lowest degree of salinity is found in the eddy's center, less than 34.0 per mill, increasing toward the edges to 34.4 per mill. The T,S curves for the cyclone and the surrounding waters are significantly different. An intensification of the cold rings during their displacement northward was observed and is reported here for the first time. This effect produces significant inhomogeneities in the distribution of fields of currents, temperature, salinity, etc., far in excess of climatological values. This lends a leading role to frontal eddies in the meriodional exchange of the various parameters in the interfrontal zone of the southern ocean.

J-30183

Lappo, S.S., **Energetically active regions of the World Ocean** [Energoaktivnye oblasti Mirovogo okeana], *Akademiia nauk SSSR. Doklady,* 2984 275(4), p.1018-1021, In Russian. 11 refs.

Annual variations are described and tabulated of the oceans' water temperatures and of the corresponding air temperatures. The charts include waters surrounding Antarctica.

J-30192

Morinaga, T., **Distribution of temperature, salinity and turbidity in the antarctic ocean,** *La mer,* Aug. 1983 21(3), p.123-132, In Japanese with English summary. 13 refs.

Observations of turbidity (beam transmission) were carried out simultaneously with those of temperature and salinity in the upper layer of the antarctic ocean. The beam attenuation coefficient of the subantarctic surface water was 0.24-0.26/m which is approximately twice that of the Kuroshio, while in the antarctic surface water (summer water) it was 0.10-0.22/m. In the upper layers of 0-50 m, particles smaller than 2.0 micron in size were abundant in the water near the Antarctic Convergence zone, while in the water near the Antarctic Divergence zone particles larger than 8.0 micron were abundant. The concentration of suspended matter was 0.20-0.30 mg/l in the former and 0.40-0.50 mg/l in the latter. High turbidity layers were observed near the thermocline in the area north of 60 deg S and near the halocline in the southern area. (Auth.)

J-30201

Margolis, S.V., Kroopnick, P.M., Showers, W.J., **Paleoceanography: the history of the ocean's changing environments,** Environment of the deep sea. Rubey Volume 2. Edited by W.G. Ernst and J.G. Morin, Englewood Cliffs, Prentice-Hall, 1982, p.18-54, Refs. p.49-54.

DLC QH541.5.S3E58

The evolution of the present oceanographic and climatic regime appears to be controlled by a number of factors including the degree of buildup of polar ice, especially in the Antarctic; plate tectonics and sea-floor spreading; and extraterrestrial events during certain critical periods. This chapter discusses the significant paleoceanographic changes that occurred at the Cretaceous/Tertiary boundary, Eocene/Oligocene boundary, the early-middle Miocene, and the late Miocene. Each is associated with major changes in world climate and the oceanic and terrestrial biosphere. This chapter shows how an understanding of paleoceanographic trends will help identify changes occurring in the present-day oceans that will affect sea level, world climatic patterns, biogeographic distributions and ultimately humanity's future. (Auth.)

J-30266

Park, P.K., Kester, D.R., Duedall, I.W., Ketchum, B.H., **Radioactive wastes and the ocean: an overview,** Wastes in the ocean, Vol.3. Radioactive wastes and the ocean. Edited by P.K. Park, D.R. Kester, I.W. Duedall, and B.H. Ketchum, New York, John Wiley & Sons, 1983, p.3-46, Refs. p.42-46.

Sources of radioactive wastes and ionizing radiation effects are reviewed, as are the radioactive substances in the ocean. Latitudinal (80 N to 80 S) distribution of Sr-90 fallout during 1958-1967 and the H-3 intrusion into deep Atlantic water from 70 N to 70 S are shown. In a table showing hydrogen bomb generated H-3 distribution in major oceans in 1972, the value for the Antarctic is 800 quadrillion Bq. Strategy for waste disposal is discussed.

J-30267

Duplessy, J.C., **C-13 record of benthic foraminifera in the last interglacial ocean: implications for the carbon cycle in the global deep water circulation,** *Quaternary research,* March 1984 21(2), p.225-243, Refs. p.241-243.

The C-13/C-12 ratios of Upper Holocene benthic foraminiferal tests of deep sea cores from the various world ocean basins are compared with those of the modern total carbon dioxide measured during the GEOSECS program. Results reflect a depletion of the global organic carbon reservoir compared to the present value. Regional differences in C-13 variations between the various oceanic basins are explained by a pattern of deep water circulation different from the modern one: the Antarctic Bottom Water production during the last interglaciation was higher than today, but the eastward transport in the Circumpolar Deep Water was lower. (Auth. mod.)

J-30268

Howard, W.R., Prell, W.L., **Comparison of radiolarian and foraminiferal paleoecology in the southern Indian Ocean: new evidence for the interhemispheric timing of climatic change,** *Quaternary research,* March 1984 21(2), p.244-263, Refs. p.261-263.

The deglacial transition between oxygen-isotope Stages 6 and 5e is marked by both oxygen isotopic depletion and estimated sea-surface temperature increase in two subantarctic Indian Ocean cores. Comparison of core-top assemblages with surface and subsurface conditions reveals that a three-part foraminiferal zonation reflects the surface hydrographic regime, with abrupt faunal transitions at the Subtropical Convergence (STC) and the Antarctic Polar Front (APF); and a two-part radiolarian zonation coincides with a two-part subsurface hydrographic regime, with an abrupt faunal transition corresponding to the southern terminus of subtropical lower water between the STC and the APF. It is suggested that shifts of these surface and subsurface regimes are recorded by these foraminiferal and radiolarian assemblages. Schematic maps of water-mass boundaries and dominance areas of radiolarian and foraminiferal assemblages between 20 and 60 S and 20 and 150 E are shown. (Auth. mod.)

J-30307

Inoue, M., **Vertical structure of the low-frequency currents at Drake Passage,** College Station, Texas A&M University, 1982, 220p., University Microfilms order No. 82-26097, Ph.D. thesis. Refs. p.210-219.

Recently collected hydrographic data show that each of the four water mass zones previously identified in Drake Passage is characterized by a distinctly different vertical profile of Brunt-Vaisala frequency. Stratification in Drake Passage is rather weak, and the first baroclinic radius of deformation varies from 17.3 km for the subantarctic zone in the north to 7.7 km for the continental zone in the south. The effects of various stratification profiles on oceanic response to atmospheric forcing and on baroclinic instability were considered. The oceanic response to a simple atmospheric forcing function, the length scales of which are of the order of more than 100 km, is dominated by the barotropic mode. For the stratification profiles and mean currents characteristic of Drake Passage, the zonal wave length of the fastest growing wave varies from 180 km in the subantarctic zone to 91 km in the continental zone, consistent with observed eddy scales. Barotropic and first baroclinic modes dominate the fastest growing waves, explaining the observed dominance of the two modes and the modal coupling. (Auth.)

J-30467

Fu, L.-L., Chelton, D.B., **Temporal variability of the Antarctic Circumpolar Current observed from satellite altimetry,** *Science,* Oct. 19, 1984 226(4672), p.343-345, 13 refs.

Sea level measurements by the Seasat altimeter were used to study the temporal variability of the Antarctic Circumpolar Current between July and October 1978. Large-scale zonal coherence in the cross-stream sea level difference was observed, indicating a general increase in the surface geostrophic velocity of the current around the Southern Ocean. The result demonstrates the power of satellite altimetry to monitor the variability of large-scale ocean currents. (Auth.)

J-30470

Biggs, D.C., Bidigare, R.R., **Oceanographic studies of epipelagic ammonium dynamics in the Scotia Sea, *Islas Orcadas* Cruises 17 and 19,** College Station, Texas A & M University, 1981, 41p. + appends., 27 refs.

This research was directed at estimating the biogenic turnover rate of NH4+ in surface waters of the Scotia Sea. NH4+ is a preferred nitrogen source for phytoplankton growth and the principal nitrogenous waste excreted by zooplankton and micronekton. Zooplankton excretion provides a significant percentage of the total daily nitrogen requirements of phytoplankton in tropical and subtropical oligotrophic open-ocean regions, and in some coastal and upwelling regions as well, but little is known of its relative importance for phytoplankton production in the Southern Ocean. Field programs were carried out on cruises 17 and 19 of ARA Islas Orcadas in austral late winter-early spring and in austral summer of 1978-1979. Both cruises focused on measuring zooplankton NH4+ excretion and water column NH4+ concentrations. In addition, uptake of N-15H4+ and N-15O3- was investigated on cruise 19. Results of the measurements are reported. (Auth. mod.)

J-30471

MacDonald, S.E., **Sedimentologic and paleoceanographic implications of terrigenous deposits on the Maurice Ewing Bank, southwest Atlantic sector,** Houston, Texas, Rice University, 1984, 207p., M.A. thesis. Refs. p.181-192.

Grain size distributions of sediment samples are utilized to identify styles of sediment transport and current velocities at the benthic boundary layer. These data, along with physical oceanographic information, allow for examination of the relationship between sedimentation on the bank and circumpolar currents. Causal relationships between glacial episodes, current intensification, and bottom current scour were previously postulated. Results indicate that modern sediment distribution is controlled by both bottom and surface currents, and is modified by mass-flow processes. Indirect determinations of current velocities, using a curve relating sediment transport to current velocity, suggest a uniform energy regime of 8-12 cm/sec over the bank. These moderate velocities are supported by geostrophic velocity profiles. Current velocities assigned to down-core samples indicate no major fluctuations in circumpolar current intensity since Plio-Pleistocene time. Similar results were obtained from examination of Argentine Basin cores. (Auth. mod.)

J-30499

Sandwell, D.T., **Detailed view of the South Pacific geoid from satellite altimetry,** *Journal of geophysical research,* Feb. 10, 1984 89(B2), p.1089-1104, 56 refs.

Images of sea surface undulations in the South Pacific have been constructed from GEOS 3 and SEASAT altimeter data. Height discrepancies at crossover points, associated with long-wavelength radial orbit error, were suppressed by taking along-track derivatives of the ascending and descending profiles. These geoid slopes were then rotated and scaled to produce the north and east components of the deflection of the vertical. Finally, the results are displayed by using the hill shading technique, where gray-tone images represent the inner product of the deflection vector with an assigned sun vector. Less apparent sea surface undulations can be enhanced by varying the sun's zenith and azimuth. Shorter-wavelength sea surface undulations reflect seafloor topography. Fracture zones (FZ's) appear as elongated sharp steps in the sea surface, while seamounts produce circular bumps. Data from antarctic and subantarctic areas are included in the anlysis. (Auth. mod.)

J-30511

Hanzawa, T., Iwamoto, K., **Oceanographic data of the 24th Japanese Antarctic Research Expedition from November 1982 to April 1983,** *Japanese Antarctic Research Expedition. JARE data reports,* July 1984 No.95, 39p.

The report presents oceanographic data gathered from aboard the icebreaker *Fuji* and tidal observations at Showa made during the summer of 1982-83. The organization of the gathering process and types of data collected are given. Cruise data include surface observations, current measurements with geomagnetic electrokinetograph (GEK), bathythermograph (BT), and serial observations. Hourly, daily mean, and monthly mean tidal heights were measured at Showa Station.

J-30515

DeMaster, D.J., Nittrouer, C.A., Hoffman, P.A., **Biogenic silica accumulation on the antarctic continental shelf,** *Antarctic journal of the United States,* 1983 18(5), p.132-134, 3 refs.

During January and February 1983, 35 box cores were collected aboard the icebreaker *Glacier* from the Antarctic continental shelf. The cores were obtained between McMurdo Station and Franklin Island as well as along the Ross Ice Shelf eastward to Sulzberger Bay. Biogenic silica, which was measured using an alkaline leach, varied from 2% (by weight) in Sulzberger Bay to 35% near Franklin and Ross Islands. The siliceous ooze deposits in this area suggest that Antarctic shelf sediments may be a significant site for silica removal in the marine environment. Sediment accumulation rates in this area are being determined using Pb-210 geochronology.

J-30516

Pillsbury, R.D., Lewis, E.L., Jacobs, S.S., **Ross Sea heat flux experiment field activities,** *Antarctic journal of the United States,* 1983 18(5), p.134-135, 1 ref.

An experiment to measure the flux of heat across the Ross Sea continental shelf and under the Ross Ice Shelf began in the 1982-83 austral summer. Data were collected aboard the USCGC Glacier and through holes in the sea ice at McMurdo Sound. The observations carried out are summarized. Hydrographic data indicated that the "warm core" observed in historical transects was present, and three current meter moorings were set to measure the heat flux of that core. The moorings will be recovered and reset along with additional arrays during January of 1984.

J-30517

Gordon, A.L., **Weddell Gyre,** *Antarctic journal of the United States,* 1983 18(5), p.135-136, 5 refs.

Data collected from observations of the Weddell Gyre are reviewed. The U.S.-U.S.S.R. Weddell Polynya Expedition of 1981 aboard the Soviet ship *Somov* obtained an array of *in situ* conductivity-temperature-depth-oxygen sensors/rosette hydrographic stations, in conjunction with biological, chemical, sea-ice, and atmospheric data. Analyses of the hydrographic data lead to two studies in which the characteristics of the ocean below the sea-ice cover are described. Warm WDW cells were observed within the Weddell trough, which are believed to be derived from instability within the frontal zone. The *Somov* data also reveal that the surface mixed layer below the sea ice cover is undersaturated in O2 by as much as 1.1 ml/l. This deficit is believed to be a consequence of O2-poor (4.5 ml/l) WDW entrainment by the winter mixed layer. A mean annual heat flux of 15 w/sq m was determined with an annual fresh water demand of 46 cm/yr.

J-30518

Chen, C.T.A., **Distributions of dissolved calcium and alkalinity in the Weddell Sea in winter,** *Antarctic journal of the United States,* 1983 18(5), p.136-137, 18 refs.

Dissolved calcium and titration alkalinity were measured for the first time in the winter Weddell Sea as part of the US-USSR Weddell Polynya Expedition in 1981. Both properties show no vertical variation in the water column within the precision of the measurements. The average observed calcium value has been taken as the initial concentration of calcium for the deep waters in the northeast Pacific Ocean. The *in situ* CaCO3 dissolution rate is then calculated as 0.072 micromol/kg/yr, which agrees well with the values obtained from alkalinities in the northeast Pacific.

J-30520

Corliss, B.H., Thunell, R.C., **Carbonate sedimentation beneath the Antarctic Circumpolar Current,** *Antarctic journal of the United States,* 1983 18(5), p.141-142, 5 refs.

Calcium carbonate sedimentation beneath the Antarctic Circumpolar Current (ACC) was studied based on the analysis of four USNS *Eltanin* cores taken between 38 and 48 S latitude in the southeast Indian Ocean sector of the southern ocean. Calcium carbonate (CaCO3) content and planktonic foraminiferal fragmentation are used to determine a record of calcium carbonate sedimentation over the last 440,000 years. The fragmentation records are compared with a history of deep-water circulation within the ACC based on deep-sea benthonic foraminifera from these cores to determine if there is any relationship between carbonate dissolution and deep-water circulation conditions during the Late Quaternary. The benthonic foraminiferal faunas during interglacial times are similar to those presently found in the area, indicating that interglacial deep-water circulation was similar to present-day conditions. By contrast, the *Melonis-Uvigerina* assemblage indicates a water mass within the glacial ACC which was distinctly different from the present-day Circumpolar Deep Water.

J-30541

Smith, W.O., **Oceanography of the antarctic marginal ice zone,** *Antarctic journal of the United States,* 1983 18(5), p.190-192, 1 refs.

Studies of the causes and spatial extent of ice-edge phytoplankton blooms conducted onboard the *Glacier* north of McMurdo Sound are summarized. Water samples were collected for measurements of salinity, nutrients, chlorophyll *a*, particulate carbon, nitrogen, and silicon, phytoplankton taxonomy, primary productivity, nutrient uptake rates, and conductivity/temperature profiles. Chlorophyll/temperature profiles indicate that, in regions of melting pack ice, a stable surface layer was created which then became the site of active phytoplankton growth and accumulation.

J-30552

Bagriantsev, N.V., Sarukhanian, E.I., **Weddell polynya as a consequence of hydrophysical processes in the Weddell circulation** [Polyn'ia Ueddella kak sledstvie gidrofizicheskikh protsessov v krugovorote Ueddella], *Akademiia nauk SSSR. Doklady,* 1984 276(5), p.1238-1242, In Russian. 13 refs.

Oceanographic data collected in Jan.-March 1981, on the water mass distribution and mixing of the Antarctic Circumpolar Current with the warm Weddell counter-current, and their interaction with the warm and strong winds blowing over the Weddell Sea, are used to explain the formation of polynyas in the area.

J-30582

Gregory, M.R., Kirk, R.M., Mabin, M.C.G., **Pelagic tar, oil, plastics and other litter in surface waters of the New Zealand sector of the southern ocean, and on Ross Dependency shores,** *New Zealand antarctic record,* 1984 6(1), p.12-28, 44 refs.

After pointing out the global proportions of ocean pollution, results are given of a pollution survey of Ross Dependency waters. Methods and equipment used in the survey are given. Debris apparently tends to accumulate in the vicinity of the Antarctic Convergence, however accumulation/unit area seems to be inconsequential. Antarctic beach areas are presently much less contaminated by man made debris than northern beaches. The problem, however cannot be casually dismissed.

J-30596

Foster, T.D., Middleton, J.H., **Oceanographic structure of the eastern Scotia Sea—I. Physical oceanography,** *Deep-sea research,* May 1984 31(5A), p.529-550, 16 refs.

Lines of closely spaced hydrographic stations across the boundary region in the eastern Scotia Sea between waters flowing out of the Weddell Sea and those flowing through the Drake Passage were occupied in the austral summer of 1981. A clearly defined front between the two waters was not observed except in the section just north of the South Orkneys near where the two currents evidently first come together. Downstream of this front is a region of eddy-like structures that increases in width almost linearly with distance. Energy spectra of the geostrophic velocities show that the strengths of the eddies also increase downstream. The boundary region thus has some of the appearances of a turbulent shear layer induced by the difference in velocity between the two currents, but as the size of the eddies remains nearly constant, baroclinic instability may also contribute to their formation. (Auth.)

J-30614

Paren, J.G., Potter, J.R., **Isotopic tracers in polar seas and glacier ice,** *Journal of geophysical research,* Jan. 20, 1984 89(C1), p.749-750, 9 refs.

The relationship between isotope concentration and salinity, as evidence of the origin of water masses, is explored. A source of error implicit in the use of isotope salinity diagrams, for the purpose of deducing the isotopic composition of the ice melt derived from precipitation over central Antarctica, is discussed. (Auth. mod.)

J-30637

Treshnikov, A.F., **Results of Soviet research in the southern ocean,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.99-116, TT 79-52012, For Russian original see 10J-21693 or 33-3620. 32 refs.

A history of Soviet Antarctic Expedition work in the southern ocean in the last 20 years is given. Over this period 1,500 oceanographical sampling points were used, hundreds of thousands of miles covered by echo sounding, characteristics of surface circulation studied over 35,000 miles, and deep circulation investigated at 26 stations. Bottom sediments were sampled at more than 500 stations and more than 200 measurements taken of sediment depth. Biological studies include more than 4,000 plankton and 400 benthic probes. These data allowed the geographical limits of the southern ocean to be established, the frontal zones and bordering seas defined, water masses identified, icebergs classified, sea ice masses located and tracked, and both surface and deep water circulation more completely charted. (Auth. mod.)

J-30666

Kesteven, G.L., **Southern Ocean,** Chicago, University of Chicago Press, 1978, p.467-499, Ocean yearbook 1, edited by E.M. Borgese and N. Ginsberg. Numerous refs.

In dealing with this topic the name and boundaries of southern waters are discussed. The role of ocean currents as a factor in defining the boundaries is emphasized along with that of the Antarctic Convergence and Divergence. Natural resources in these waters are discussed at length especially the renewable resources. Krill is the primary element in the food chain which includes plankton, fish, cephalopods, birds, and mammals. A section on research points up the various international bodies involved with planning and monitoring the methods and problems in harvesting the natural antarctic resources. The text of the Antarctic Treaty is appended.

J-30730

Foldvik, A., Gade, G., **World's coldest seawater** [Verdens kaldeste sjövann], *Naturen,* 1978 102(6), p.271-275, In Norwegian.

While sea water normally freezes at temperatures around 1.9 C, water temperatures as low as 2.3 C are reported to have been measured during the Norwegian Antarctic Expedition 1976/77 in the Weddell Sea with salinities between 34.6 and 34.7 per mill. Diagrams showing water temperatures measured at different locations and depths along the Filchner Ice Shelf are presented. The coldest water temperatures were found to occur at a depth of 500 m.

J-30741

Kaplin, P.A., ed, Klige, R.K., ed, Chepalyga, A.L., ed, **Sea and ocean level fluctuations for 15,000 years** [Kolebaniia urovnia moreĭ i okeanov za 15,000 let], Moscow, Nauka, 1982, 230p., In Russian. For selected papers see 39-755 through 39-758 or F-30744, J-30742, and J-30743. Refs. passim.

This collection of articles deals with late and postglacial sea level fluctuations. Both general causes and local characteristics of sea level changes are considered.

J-30742

Kaplin, P.A., **Studies of ocean level fluctuations during postglacial time** [Problemy izucheniia kolebaniĭ urovnia okeana v poslelednikovoe vremia], Kolebaniia urovnia moreĭ i okeanov za 15,000 let. (Sea and ocean level fluctuations for 15,000 years). Edited by P.A. Kaplin, R.K. Klige, and A.L. Chepalyga, Moscow, Nauka, 1982, p.6-11, In Russian. 7 refs.

Ocean level fluctuations during postglacial time are studied in relation to economic development of coastal areas. Theories and new models of the world ocean level are offered for the development of postglacial transgression. References to Antarctica, concerning the position of the western part of the ice sheet, imply sinking of the continental surface below sea level. The low hypsometric level of the surface reflects the initial position of dry land rather than isostatic ice loads. Under such conditions of ice-edge instability, its break off the main mass and rapid deterioration is possible, and due to atmospheric temperature and composition, this may occur during the next 50 years, causing general elevation of the world ocean level. Possibilities of rapid "surges" of large ice masses were substantiated, their causes are discussed, including sudden equilibrium upsets at the ice sheet edge at certain values of the rate of ice flow, friction, ice cover thickness and the form of the sheet.

J-30743

Verbitskiĭ, M.IA., **Antarctic and Greenland ice sheet influence on the level of the world ocean (a numerical experiment)** [Vliianie antarkticheskogo i grenlandskogo lednikovykh shchitov na uroven' Mirovogo okeana (chislennyĭ eksperiment)], Kolebaniia urovnia moreĭ i okeanov za 15,000 let. (Sea and ocean level fluctuations for 15,000 years). Edited by P.A. Kaplin, R.K. Klige, and A.L. Chepalyga, Moscow, Nauka, 1982, p.120-124, In Russian. 12 refs.

DLC GC89.K63

Based on analysis of a three-dimensional thermohydrodynamic ice-sheet model, quantitative estimates of sea level changes due to warming of climate are presented. Oxygen isotope data from 15 to 20 thousand year old ice, showing a 5 deg decrease of temperature in Antarctica, also show a decrease of precipitation rate by a factor of 1.9. Tabulated data show the relationship between temperature and the increase of precipitation to be 14% to 1 deg C. Significant destruction of the ice sheet would begin only if temperatures were to increase by 10-12 deg. The maximum sea level rise in such an event would be 60 m.

J-30816

Sievers, H.A., Nowlin, W.D., Jr., **Stratification and water masses at Drake Passage,** *Journal of geophysical research,* Nov. 20, 1984 89(C6), p.10,489-10,514, 59 refs.

Vertical sections of closely spaced oceanographic stations made across Drake Passage in the summers of 1975 and 1976 produced quality measurements of temperature, salinity, oxygen, silicate, nitrate, and phosphate. Based on these data, a traditional description of characteristic distributions is presented. Good sampling resolution in the vertical allows maxima in hydrostatic stability to be traced laterally (approximately along isopycnals) between individual stations. Eleven strata of maximum stability are identified. Most vertically separate distinct water masses. The most pronounced stability stratum is associated with the seasonal pycnocline. The densest water mass found is Weddell Sea Deep Water, which flows through a gap in the South Scotia Ridge and along the southern Scotia Sea to fill the trough in the southern Drake Passage. It is overlain by a laterally continuous stratum of relative maximum stability. (Auth. mod.)

J-30817

Kennett, J.P., **Paleo-oceanography: global ocean evolution,** *Reviews of geophysics and space physics,* June 1983 21(5), p.1258-1274, U.S. National report to IUGG, 1979-1982. Refs. p.1269-1274.

Paleoceanography, one of the youngest branches of earth sciences, is concerned with the development of oceanic circulation through geologic time. This is a multifaceted and integrated endeavor since none of the subdisciplines is easily separated from the others. The field is holistic in character, and includes the history and effects of bottom, intermediate and surface circulation patterns, planktonic and benthonic biogeographic development and rates of organic evolution, the history of biogenic productivity and dissolution and their effect on sediment distribution and the consequences of sea level change. Paleoceanography was largely born of the Deep Sea Drilling Project (DSDP) and continues to be nourished by it. This article is a brief overview of a number of advances that have occurred in paleoceanography and related fields during the period from 1979 to 1982. Specific topics addressed include: paleoreconstructions, chronostratigraphy, biostratigraphy and evolution, stable isotope studies, sea-level history, deep paleocirculation and significant events and features identified from cretaceous oceans upward through the Holocene deglaciation.

J-30834

Lutjeharms, J.R.E., Emery, W.J., **Detailed thermal structure of upper ocean layers between Capetown and Antarctica during the period Jan.-Feb. 1978,** *South African journal of antarctic research,* 1983 Vol.13, p.3-14, In English with Afrikaans summary. 36 refs.

Two hydrographic sections consisting of closely spaced expendable bathythermograph stations have been undertaken between Cape Town and Antarctica. Surface salinities and continuous surface temperature measurements were undertaken simultaneously. The results show detail of the thermal fronts in this oceanic area and these are discussed in the light of previous comparable measurements. (Auth.)

J-30844

Kort, V.G., **Temperature anomalies in the southern ocean** [Temperaturnye anomalii v IUzhnom okeane], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1984 No.105, p.5-11, In Russian.

The relationship between prolonged water temperature anomalies and atmospheric circulation and pressure is discussed; the correlation coefficients are tabulated. Measurements of southern ocean surface temperature, carried out from Jan.-Sept. 1979, show 31 prolonged anomalies over an area of between 1300 and 2500 km. 16 anomalies, lasting between 10 and 30 hours, are warm, with an average fluctuation of between 2.3 and 4.2 deg C; the other 15, lasting between 30 and 100 hours, are cold and fluctuate between -0.1 and -3.4 deg C. Maximum values reach 6.2 and -6.7 degrees.

J-30848

Dmitrash, Zh.A., Ionov, V.V., Rebenkova, O.A., **Use of satellite TV images for location of oceanic fronts** [Opyt ispol'zovaniia sputnikovoĭ TV informatsii dlia opredeleniia mestopolozheniia okeanicheskogo flota], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten'*, 1984 No.105, p.29-32, In Russian. 4 refs.

Study of cloud formations is reported, from data collected by satellite, which permitted to determine the location of the hydrological front, showing the zone of maximum horizontal gradients to be between latitudes 57 and 56 S, where the temperature dropped by 2.5 deg (from 3.7 to 6 deg). It was also found that the seasonal position of the polar front differs from the climatological position shown in the *Antarctic Atlas* by 3 deg of latitude.

J-30860

Loynes, J., Potter, J.R., Paren, J.G., **Current, temperature, and salinity beneath George VI Ice Shelf, Antarctica,** *Deep-sea research*, Sep. 1984 31(9), p.1037-1055, 20 refs.

Speed, direction, temperature, and conductivity were recorded from February to July 1980 within the thermocline near the northern ice front of George VI Ice Shelf. There were no significant changes in temperature or salinity from summer to winter. Fluctuations of around 10 and 40 days periodicity were observed in the current and temperature, and similar variations are evident in meteorological observations. Temperature oscillations were observed at tidal frequencies and may be caused by horizontal advection or internal wave motion. The horizontal kinetic energy is dominated by low-frequency periods (46%), semi-diurnal tides (40%), and diurnal tides (10%). Tidal ellipses have their major axes aligned along George VI Sound and are described anticlockwise. Terdiurnal constituents, which may be a particular effect in the response of a floating ice shelf to tide generating forces, were observed. The M2 constituent was highly suppressed. Both the amplitude of M2 current and the speed of the mean flow decreased sharply in mid-April. These changes may be related to increasing sea-ice cover with the onset of winter. The mean flow is directed eastwards across the narrow channel, parallel to the ice front and at right angles to the major axes of the tidal ellipses. We speculate on reasons for this unusual behaviour. (Auth.)

J-30861

Smith, N.R., Zhaoqian, D., Kerry, K.R., Wright, S., **Water masses and circulation in the region of Prydz Bay, Antarctica,** *Deep-sea research*, Sep. 1984 31(9), p.1121-1147, 62 refs.

Hydrographic and expendable bathythermograph (XBT) measurements are used to describe the characteristics and circulation of the water within and to the north of Prydz Bay. Surface waters in Prydz Bay are highly variable and are linked to local ice conditions. The isolation of a warm surface feature corroborates previous suggestions of a permanent high surface temperature anomaly. Water mass analysis reveals both high- and low-salinity varieties of continental shelf water and a significant Ice Shelf Water mode. Low-salinity shelf water is confined to the West Ice Shelf region and high-salinity shelf water to the central and western areas of Prydz Bay. The Ice Shelf Water mass is related to freezing beneath the Amery Ice Shelf and to prolonged isolation due to topographic restraints. Geostrophic calculations show predominantly westward flow adjacent to the continental rise and a large cyclonic gyre in Prydz Bay. The off-shelf pattern is consistent with previous calculations from hydrographic data and with iceberg and buoy observations. The water masses and circulation within Prydz Bay resemble those of similar sites within the Weddell and Ross seas but there are significant differences. (Auth. mod.)

J-30862

Michel, R.L., **Oceanographic structure of the eastern Scotia Sea—2. Chemical oceanography,** *Deep-sea research*, Oct. 1984 31(10), p.1157-1168, For Part 1 see 14J-30596. 15 refs.

During this 1981 multidisciplinary study samples were analyzed for silicate, nitrate, and tritium. Most silicate sections showed a pronounced increase in concentrations from north to south in the surface waters. A frontal-type structure in the temperature and salinity fields in the section just north of the South Orkneys, where water flowing through the Drake Passage meets that from the Weddell Sea, is mirrored in the silicate section. Further downstream the silicate sections show no distinct trends in the deep waters, but the distributions are characteristic of meso-scale eddies. No significant horizontal gradients are evident in the nitrate sections, but a nitrate maximum is present in all sections, generally between 200 and 300 m. Tritium profiles are presented for eight stations on two of the sections. Surface tritium concentrations are low (0.3 to 0.4 TU) with the highest concentrations in the north. There was substantial tritium at two stations on the most western section, indicating up to 50% of the deep water may have come from the surface since the early 1960s. On the section to the east, tritium concentrations dropped rapidly below the temperature minimum, and there was essentially no tritium in deep waters. At most, 10% of the deep waters could have come from the surface since the advent of nuclear testing. (Auth.)

J-30884

Bersch, M., Becker, G.A., **Upper layer thermal structure in the Atlantic sector of the southern ocean,** *Deutsche hydrographische Zeitschrift*, 1984 37(2), p.71-86, With German and French summaries. 27 refs.

On the basis of 7 XBT sections of South America-Antarctica and South Africa-Antarctica the variability of the Subtropical Convergence (STC), the Polar Frontal Zone (PFZ) and the Weddell-Scotia Confluence (WSC) are particularly discussed. Between 45 W and 56 W, the STC is shifted to the South by 2.3 degrees of latitude confining a tongue of subtropical surface water near the continental slope of the Patagonian shelf. Further South, the PFZ is displaced to the North by 7 degrees of latitude between 58 W and 39 W. An intense Subantarctic Front has been observed northwestwards of South Georgia. Even East of the South Sandwich Islands the WSC can be detected by a positive temperature anomaly. (Auth.)

J-30887

Boroukhin, E.A., Kobylianskiĭ, V.V., Pozdeev, IU.S., **Study of water mass transport in the Antarctic Circumpolar Current with the aid of tritium,** *Doklady. Earth science sections,* 1983 268(1), p.218-220, For Russian original see 13J-28472. 5 refs.

The half-life period of tritium (12.43 years) enables slow total transport of high tritium content water to be found over periods of several tens of years. The data presented suggest westward transport from the Ross Sea along the Antarctic shelf south of the Balleny Is., not only in the surface but also in the bottom layer.

J-30923

Nishiyama, T., **Idea on extraction of uranium from seawater using the drift of icebergs**, *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.184-186, 7 refs.

On recovering uranium from seawater, one of the most radical problems awaiting solution is how to contact economically an enormous quantity of seawater with absorbents. In this paper a new method of mechanical cable-bucket system combined with the drift of icebergs is discussed. In order to determine the amount of recoverable uranium, an iceberg of 1 km in length and drifting at 1 kt was chosen. A 5-km loop with absorbent buckets attached at 3 m intervals was hung over the iceberg. Assuming that absorption efficiency is 30% and desorption efficiency 90%, the amount of uranium produced by this recovery process is estimated to be 77 t a year. (Auth.)

J-30937

Treshnikov, A.F., Krutskikh, B.A., Nikiforov, E.G., Zakharov, V.F., Nikolaev, IU.V., **Problems of polar oceanology** [Aktual'nye problemy poliarnoĭ okeanologii], Issledovanie okeana (Studies of the ocean) edited by L.M. Brekhovskikh and E.M. Kukharkov, Moscow, Nauka, 1984, p.38-53, In Russian. 20 refs.

Soviet oceanographic investigations in the polar regions during the past decades are reviewed. The principal economic interest of those in the Antarctic was the utilization of biological resources of the southern ocean, which required studies of long-range ice, weather and climatic forecasts, and of problems related to the role of the ocean in energy balance of the southern polar region. The POLEX-South-81 expedition, performed complex hydrometeorological studies in the Australian sector, where air-mass transfer and the development of meridional processes were often disturbed; its program also included studies of the Antarctic circumpolar current, and the formation of the Antarctic Bottom Waters. Investigations performed were more of an exploratory nature, and similar studies continued in the Weddell Sea in 1981-82.

J-30981

Foster, T.D., **Marine environment,** Antarctic ecology, R.M. Laws, ed., London, Orlando, Academic Press, 1984, p.345-371, 28 refs.

DLC QH84.2.A58 1984

Principal features of antarctic waters are shown on charts and discussed. These include the seasonal distribution of sea ice, icebergs, and ice shelves; oceanic circulation; major ocean currents; and chemical and thermal characteristics of primary water masses.

J-31079

Treshnikov, A.F., **Soviet-American investigations in the southern ocean** [Sovetsko-amerikanskie issledovaniia v IUzhnom okeane], *Akademiia nauk SSSR. Vestnik,* 1979 No.6, p.105-108, In Russian.

DLC AS262.A627

Investigations carried out jointly by Soviet and American scientists during three years under the POLEX-South and International Southern Ocean Studies programs are outlined. The projects included studies of the structure and dynamics of the Antarctic Circumpolar Current and its influence on the currents north and south of it; the structure and dynamics of antarctic polar front and its role in the formation of antarctic intermediate waters; the mechanism of antarctic bottom water masses; the interrelationship of atmosphere and ocean; and the numerical modeling of the southern ocean circulation. Plans for continued cooperation are given.

J-31081

Blatov, A.S., Tuzhilkin, V.S., **Hydrological structure and energetics in mesoscale vortex formations of the world oceans** [Gidrologicheskaia struktura i energetika srednemasshtabnykh vikhreĭ v Mirovom okeane], *Voprosy geografii,* 1984 Vol.125, p.84-102, In Russian. Numerous refs. at end of journal.

Some methods of determination of the principal hydrological and circulation parameters in oceanic mesoscale vortex formations are presented. Results of computations of vortexes of different types in various regions of the world ocean, including the Antarctic Circumpolar Current, and citations of published data on which they are based, are tabulated.

J-31085

Pillsbury, R.D., Bottero, J.S., **Observations of current rings in the antarctic zone at Drake Passage,** *Journal of marine research,* Nov. 1984 42(4), p.853-872, 23 refs.

Time series of current velocity and temperature from several depths at a site near the center of Drake Passage show features that can plausibly be interpreted as current rings. Between June 1975 and January 1976, five cyclonic rings from the Continental Water Boundary and one anticyclonic ring from the polar front passed over the site. The diameters of the rings varied from 30 km to 130 km, and all of them extended vertically to a depth of at least 2500 m. The rings exhibited maximum spin velocities of about 20 cm/sec at 1000 m depth and 10 cm/sec at 2500 m. Their translatory motion, which was toward the north at about 4 cm/sec, contained a westward component relative to the ambient flow. The magnitude of the westward component suggests that it may have resulted from an interaction between rings and the sea floor, which slopes downward to the northeast at the mooring site. The current rings may play an important role in dissipating the kinetic energy of the circumpolar fronts and they may be responsible for a significant poleward flux of heat in the southern ocean. (Auth.)

J-31093

Szekielda, K.-H., **Satellite investigations on the fluctuations of the subtropical and antarctic convergence zones,** *Deutsche hydrographische Zeitschrift,* 1983 36(1), p.25-43, French and German summaries. 11 refs.

Investigations have been made using GOSSTCOMP (Global Ocean Sea Surface Temperature Computer Program) data in the area of the subtropical and antarctic convergence zones. The study showed that the positions of both boundaries undergo oscillations in E-W direction and it is assumed that the circumpolar current may act on both boundaries of the convergence zones. Since it seems that the antarctic convergence zone is not as stable as has been postulated before, it is suggested that unstable waves, gyres and interaction of different water bodies are the major causes of the observed changes in the location of the two zones. (Auth.)

J-31094

Schröder, M., **Characteristics of a salinity front in the eastern Bransfield Strait, the source region of the Weddell-Scotia Confluence** [Beschreibung einer Salzgehaltsfront in der östlichen Bransfield-Strasse, dem Ursprungsgebiet der Weddell-Scotia-Konfluenz], *Deutsche hydrographische Zeitschrift,* 1983 36(6), p.217-235, In German with English and French summaries. 12 refs.

Hydrographic data of the near-surface layer (0-200 m) are presented, which were measured in a small area within the Bransfield Strait during December 1980 by RV *Meteor* as part of cruise No.56. Profiles and two vertical sections show a sharp salinity front (delta S = 0.3), in a northeast direction, extending to a maximum depth of 120 m. Two main water masses obtain: cold and saline water of the Weddell Sea coming from the south, and warmer, less saline water of the Bransfield Strait in the northern part of the front. Comparisons with historical hydrographic stations suggest that this front is a continuous phenomenon, which may possibly be the origin of the Weddell-Scotia Confluence extending out of this area as far as 30E. (Auth.)

J-31101

Worley, S.J., Nowlin, W.D., Jr., **Oceanographic data collected aboard R/V *Melville* during Jan.-Feb. 1979 and AGS *Yelcho* during Apr.-May 1979 as a part of DRAKE 79,** *Texas A and M University. Department of Oceanography. Technical report,* Oct. 1979 TAMU-REF-79-7-T, 159p., PB80-183080, 7 refs.

The following activities during the cruises aboard R/V *Melville* and AGS *Yelcho* are reported: deployment of a yearlong moored array; occupation of hydrographic stations, and collection of underway data including expendable bathythermographs. The line of moored instruments across the Passage, and a set of seven moorings west of this line, monitor transport fluctuations and internal structure in order to study space and time scales and interactions between shelf and offshore areas. Tabulated hydrographic data are presented for depth, temperature, salinity and oxygen.

J-31113

MacAyeal, D.R., **Potential effect of CO2 warming on sub-ice-shelf circulation and basal melting,** Environment of West Antarctica: potential CO2-induced changes; report of a workshop, July 1983, Washington, D.C., 1984, p.212-221, PB85-110 757, 8 refs.

The author argues, and is supported by others, that the key link in the chain that binds shelf ice to West Antarctica is the state of the ocean beneath the shelves. If there should be sufficient warming of those waters through advective currents, accelerated melting of the ice shelves from below could result. Present knowledge of sub-ice shelf currents is reviewed and a priority list of research to expand that knowledge is presented.

J-31131

Whitman, J.M., Harrison, C.G.A., Brass, G.W., **Tectonic evolution of the Pacific Ocean since 74 Ma,** *Tectonophysics,* Dec. 1983 99(2-4), p.241-249, 14 refs.

DLC QE500.T4

For the Pacific Ocean, Plate motions are determined back to 74 Ma. This time marks the initiation of spreading at the Pacific-Antarctic Ridge which caused the separation of the Campbell Plateau from Antarctica. Thus, this time is the earliest fix on the position of the Pacific plate relative to the continents surrounding the Pacific Ocean basin using sea-floor spreading. Since it is not possible to derive quantitative information about the relative motion between two plates separated by a trench all rotations for the oceanic plates of the Pacific Basin are calculated relative to the Pacific plate and then relative to North America through the plate circuit. (Auth. mod.)

J-31143

Gritsenko, A.M., **Statistical estimates of the Antarctic Circumpolar Current in the Pacific Ocean,** *Oceanology,* 1982 (Pub. Feb. 1983) 22(4), p.409-412, Translated from Okeanologiia. 5 refs.

A two-dimensional empirical probability function was used in a statistical study of the mean multiyear circulation of the Antarctic Circumpolar Current. In order to study the variability of this current with depth, the circulation at standard depths was correlated with that of the surface. It is concluded that there is no continuous westward flow at depth.

J-31146

Malek, V.N., **Diagnostic calculations of water circulation in the Australian-New Zealand sector of the southern ocean based on data from the POLEX-South-81 experiment,** *Oceanology,* 1983 23(3), p.323-326, Translated from Okeanologiia. 13 refs.

An attempt is made in the context of a linear diagnostic model to study the three-dimensional water circulation in the Australia-New Zealand sector of the southern ocean during the summer of 1981. The calculations are based on the temperature and salinity fields obtained in hydrological surveys, with 1 deg and 2.5 deg grid steps in latitude and longitude, respectively. The water circulation in this area of the ocean is shown to have a complex structure, the Antarctic Circumpolar Current being the main element of the upper 1-km layer. In the deeper layers, meridional flows and eddy formations predominate. The current patterns are presented. (Auth.)

J-31147

Andreeva, N.M., Poluiaktov, V.F., **Hydrochemical investigations in the Lazarev Sea,** *Oceanology,* 1983 (Pub. Apr. 1984) 23(5), p.605-608, Translated from Okeanologiia. 3 refs.

Based on the results of investigations carried out during the 19th Antarctic expedition of the All-Union Research Institute of Marine Fisheries and Oceanography (VNIRO) aboard the R/V *Academic Knipovich* in March 1981 characteristic features of the distribution pattern of dissolved oxygen, silicates, phosphates, nitrates and nitrites have been revealed. The water circulation pattern was found to be fully reflected in the distribution of dissolved oxygen.

J-31148

Gordon, A., Jacobs, S., **Voyages of discovery and research in the southern and antarctic regions during the years 1964-1981,** *Columbia University. Lamont-Doherty Geological Observatory. Yearbook,* 1981 Vol.7, p.25-29, 5 refs.

DLC QE47.N5C64a

A general account of oceanographic studies by Lamont-Doherty Observatory scientists is given. Maps and charts illustrate the antarctic geostrophic current at the sea surface relative to the 1000-dbar level; temperature, salinity, silicate, and phosphate in the surface waters between South Africa and Antarctica; vertical temperature sections spaced about 100 km apart and extending north-south across the Ross Sea continental shelf; and the Weddell Polynya positions between 1973 and 1979.

J-31160

Eckstaller, A., Miller, H., **Vertical tidal motion of Filchner Ice Shelf** [Gezeiten-Vertikalbewegung des Filchner Schelfeises], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.82-97, In German. 2 refs.

It was planned that, during the survey of the Filchner Ice Shelf, the recording of the vertical tidal motions of the sea beneath the shelf would be expanded and that the reaction of the shelf ice to the sea swell would be monitored. To these ends tidal instrumentation was installed at Filchner Station and at other data points along the traverse route, and information on the ebb and flow of the sea was gathered. First results of this program are assessed and the instruments are evaluated.

J-31165

Rohardt, G., **Hydrographic investigations at the edge of the Filchner Ice Shelf** [Hydrographische Untersuchungen am Rand des Filchner Schelfeises], *Bremerhaven, Germany. Alfred-Wegener-Institut für Polarforschung. Berichte zur Polarforschung,* Nov. 1984 No.19, p.137-143, In German. 4 refs.

The oceanographic program is reviewed: CTD sounding of the shelf ice region for carrying out water mass analysis; beginning construction of a permanent station above the Filchner mooring; continuing oceanographic studies with hydrographic measurements. For these a section was retraced along the ice front from 40W to the Antarctic Peninsula and a second one over the eastern half of the Filchner Depression. Agreement with earlier measurements was established. Additionally, the permanent station shows tide effects near the ice front where warm deep water intrudes upon the shelf.

J-31231

Tchernia, P., Jeannin, P.F., **Circulation in antarctic waters as revealed by iceberg tracks 1972-1983,** *Polar record,* Sep. 1984 22(138), p.263-269, 4 refs.

Successively using positioning satellites Eole, Nimbus F, Tiros N-Argos, movements of 21 Antarctic icebergs were monitored daily from radio transmissions; 17 of the bergs were followed over periods of 228-828 days through distances of 1600 to 8000 km. Mean daily positions, calculated from several observations, were accurate to less than 5.5 km for Eole and Nimbus, 0.9 km for Argos. Grouped into three areas (Weddell Sea, Enderby Land to Adélie Land, Ross Sea), the trajectories cover four fifths of the continental periphery. Movements clearly indicate singular points along the boundary between the two circumpolar currents, the East Wind and West Wind drifts, and variations in the strength and direction of flow of these currents; submarine topography and other underlying causes are suggested. (Auth.)

J-31234

Paterlini, C.M., Nuñez, J.H., Keller, M.A., **Regional aeromagnetic survey of the northwestern Weddell Sea, Antarctica,** *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1984 No.306, 16 + 16p., In Spanish and English, with French and German summaries. 16 refs.

In March 1982 an aeromagnetic survey by helicopter was carried out of the continental shelf under the northwestern portion of the Weddell Sea. A magnetometer of the rubidium steam optical pumping type, total field, the sensor of which was towed within a streamlined body built to that end, was used. Also used were two magnetometers of the protonic type for the continuous record of the diurnal variations of the terrestrial magnetic field. After the reduction and processing of the data obtained, track charts and several graphs of the magnetic anomalies were drawn and are presented in this report. (Auth. mod.)

J-31240

Marra, J., Boardman, D.C., **Late winter chlorophyll *a* distributions in the Weddell Sea,** *Marine ecology progress series,* Oct. 1984 19(3), p.197-205, 55 refs.

Chlorophyll *a* measurements were made in 3 different environments: beneath the pack ice, in pack ice cores, and in the water column in the ice edge zone (IEZ). Phytoplankton photosynthesis measurements were made on samples from beneath the pack ice and from a station at the IEZ. Chlorophyll *a* values in the mixed layer beneath the pack ice average 12 mg/sq m. Within the IEZ (at 6/10's coverage) water column chlorophyll *a* doubles. Compared to values beneath the pack ice, the IEZ is characterized by a localized ten-fold increase in surface chlorophyll *a*. Photosynthesis parameters likewise increase at the ice edge, and a rate of primary production of 300 to 400 mg/sq m/d is estimated for this region. Significant amounts of chlorophyll *a* are found near the base of the pack ice column, and evidence is presented which suggests an active biological community living within the pack ice. Overall, the data are consistent with the idea that phytoplankton distributions are regulated by the availability of light. Furthermore, the data indicate the importance of the IEZ to primary production in the southern ocean. (Auth.)

J-31310

Bryden, H.L., Heath, R.A., **Energetic eddies at the northern edge of the Antarctic Circumpolar Current in the Southwest Pacific,** *Progress in oceanography,* 1985 Vol.14, Essays on oceanography. A tribute to John Swallow. Guest editors J. Crease, W.J. Gould and P.M. Saunders, p.65-87, 30 refs.

Two-year time series measurements of current and temperature were made at the northern edge of the Antarctic Circumpolar Current in the southwestern Pacific from 1978 to 1980 to investigate eddy heat and momentum fluxes in the circumpolar region. The measurement site near 49 30 S 170 W is at a transition zone or front between subantarctic and subtropical waters in which meridional temperature and salinity gradients and, hence, vertical shear in eastward velocity extend down to 2,000 m depth. Energetic eddies are found to have typical amplitudes of 20 cm/s at 1,000 m depth, to be vertically coherent over the depth range from 1,000 to 5,000 m, to vary over temporal scales of 20 days and horizontal scales of 60 km and to propagate southeastward at about 12 cm/s. Like Drake Passage eddies, these eddies transport a significant amount of heat poleward in the band of periods between 20 and 50 days, but this band does not dominate the spectrum the way it does in Drake Passage. (Auth. mod.)

J-31322

Plakhotnik, A.F., **Variability of physical phenomena and properties of oceans. History of research** [Izmenchivost' fizicheskikh iavleniĭ i svoĭstv okeana. Istoriia izucheniia], Moscow, Nauka, 1984, 232p., In Russian with abridged English table of contents enclosed. Refs. p.215-229.

Soviet literature dealing with various aspects of studying small and large-scale variations in oceanographic phenomena and related atmospheric processes is reviewed. Both general treatments and studies relating to specific areas are considered. Chapters dealing with conditions typical of polar (both Arctic and antarctic) regions are on p.99-102, 180-185 (the southern ocean) and 186-195 (the Arctic Ocean).

J-31431

Kroopnick, P.M., Margolis, S.V., Wong, C.S., **Delta C-13 variations in marine carbonate sediments as indicators of the CO2 balance between the atmosphere and oceans,** Fate of fossil fuel CO2 in the ocean. Edited by N.R. Andersen and A. Malahoff, New York, Plenum Press, 1977, p.295-321, Refs. p.319-321.

DLC GC117.C37F37

A model is presented to explain the departures from equilibrium of the ocean-atmosphere CO2-C-13 system with respect to temperature, latitude and water mass characteristics. Carbon isotope data suggests that invasion and evasion of CO2 to and from the sea is at least partially controlled by the organic productivity of a water mass. Surface water delta C-13 values are determined by exchange with the atmosphere and by the amount of carbon removed versus that replenished. Deeper water delta C-13 values are controlled by the relative rates of upwelling of deep water, by *in situ* respiration, and by the dissolution of settling particles. The record of delta C-13 fluctuations for the last 75 million years in oceanic surface and bottom waters is recorded in the calcareous remains of benthic and planktonic foraminifera and in nannofossils. (Auth. mod.)

J-31434

Hay, W.W., Southam, J.R., **Modulation of marine sedimentation by the continental shelves,** Fate of fossil fuel CO2 in the ocean. Edited by N.R. Andersen and A. Malahoff, New York, Plenum Press, 1977, p.569-604, Refs. p.603-604.

DLC GC117.C37F37

Estimates of the magnitudes of fluctuations in the mechanical and chemical loads of rivers through geological time are obtained by considering the relation between river loads and area, elevation, hypsography and climate of the present continental configuration. On long time scale it is shown that the continental shelves bypass material to deeper oceanic accumulation sites. However, for periods of rapidly rising sea level following glaciations, the sedimentation regime operates in such a way that continental margins consume a flux of CaCO3 equal to or several times larger than the input from rivers. (Auth. mod.)

J-31435
Deacon, G., **Antarctic circumpolar ocean,** Cambridge, University Press, 1984, 180p.
DLC GC461.D4

The first part of this book deals with the pioneering observations of the early explorers of Antarctica and its surrounding waters, and of the sealers and whalers who profited from the new discoveries, the observations made by polar explorers, and the systematic studies of oceanographic expeditions. The second part summarizes present knowledge of the water movements and their effects on temperature and salinity distribution, biological productivity, distribution of marine plants and animals, climate and ice cover. It is shown how present knowledge has grown from earlier findings, and how it relates to economic problems, such as the conservation of marine living resources.

J-31443
Horton, S.K., **Refraction of wave packets by currents,** *Florida Institute of Technology. Department of Oceanography and Ocean Engineering. Technical report,* Apr. 1982 No.JEB-9, 96p., ADA-133 366, Master's thesis. 16 refs.

The refraction of wave packets by ocean surface currents is investigated using a refraction method based on Snell's law with geometric group velocity. This method requires curvature equations for the directions of the wavelets and wave packets and an advection equation for the direction of the ray. These equations are derived and applied to idealized current models. The current models are patterned after the Gulf Stream and Circumpolar Current. (Auth. mod.)

J-31448
Deacon, G.E.R., **Oxygen in antarctic water,** *Deep-sea research,* Nov. 1984 31A(11), p.1369-1371, 14 refs.

Surface water in the northern part of the Antarctic zone and the tongues of Antarctic intermediate water farther north are fairly rich in oxygen, but Antarctic bottom water, though the principal aerator at the bottom of the Indian and Pacific oceans, is relatively poor in oxygen. The North Atlantic water, foremost in the Atlantic Ocean, is oxygen-rich because it sinks in areas fed by surface currents. Antarctic bottom water is oxygen-poor because its source areas are fed largely by deep currents. (Auth.)

J-31449
Lutjeharms, J.R.E., Valentine, H.R., **Southern ocean thermal fronts south of Africa,** *Deep-sea research,* Dec. 1984 31A(12), p.1461-1475, 62 refs.

A statistical analysis of the surface thermal characteristics of the major oceanic fronts in the southern ocean sector south of Africa has been carried out. The mean latitudinal locations, middle temperatures, and temperature gradients are presented for the Agulhas Front, the Sub-Tropical Convergence, the Sub-Antarctic Front, and the Antarctic Polar Front, based on 89 crossings. Wherever possible, the surface and subsurface expressions of fronts have been compared. It is shown that all four fronts have consistent and narrow thermal surface characteristics, making it possible to identify and locate their surface expressions by surface temperature measurements alone. The surface temperature traces across the Sub-Antarctic Front, and to a lesser extent across the Antarctic Polar Front, often show inversions north and south of the main horizontal gradient demarcating the front. The subsurface expressions of both the Sub-Tropical Convergence and the Antarctic Polar Front are located predominantly north of the surface expressions. It is shown that the Agulhas Front has only a limited longitudinal distribution and these limits are established. (Auth.)

J-31493
Everson, I., **Areas of seabed within selected depth ranges in the south-west Atlantic and Antarctic Peninsula regions of the southern ocean,** Cambridge, British Antarctic Survey, 1984, n.p.

Bathymetric data are presented for the region enclosed within 25-78W between 50 and 70S, encompassing the Scotia Arc and Antarctic Peninsula regions. Contours were drawn on Admiralty Charts at 50, 150, 250 and 500 meter depths. FAO sub-areas were marked in and each sub-area divided into rectangles for the analyses. Data are presented in tables which give subdivisions, coordinates, % of sea area in each of five depth ranges, and the sea area covered in sq km. 15 tables are used to present the data; Table 16 lists Admiralty Charts used, and Table 17 gives a more detailed analysis of subdivisions 50, 51, and 52 of FAO sub-area 48.3.

J-31507
Gamberoni, L., Geronimi, J., Murail, J.F., **Hydrological structure of the immediate surroundings of Reunion Island during winter (Aug.-Sept. 1982)** [Structure hydrologique aux abords immédiats de l'île de la Réunion en période hivernale (août-sept. 1982)], *Comité national français des recherches antarctiques. CNFRA,* 1984 No.55, p.41-47, In French with English summary. 4 refs.

During the August-September 1982 MD 32 cruise around Reunion Island, hydrological data were collected at less than 35 miles from the coast. These data show a contrast in the surface thermal structure between the warm waters in the northwest and the relatively cold waters in the southeast of the island. The same situation has been observed in April 1979 (off season) but in August 1977, off northwest coast, the temperature gradient was reversed. The topography of the isotherms seems also to indicate the existence of a current along the southeast coast. (Auth.)

J-31557
Thomson, R.B., **Oil pollution in the Antarctic,** Symposium on Antarctic Logistics, 3rd, Leningrad, 1982. Proceedings, Scientific Committee on Antarctic Research, [1983], p.523-535, Refs. p.527-535. This is a reading list on effects of oil pollution on a marine polar environment.

Future activities connected with antarctic mineral resource exploration and exploitation, and their likely impact on the environment, are considered. They include the need for a base on nearby land from which to support off-shore operations which, in turn, would require ship mooring facilities, workshops, large generators and heating systems, and a large number of people. It is suggested that a great deal can be learned on the subject from literature available from experience in the Arctic, and a reading list to this effect is provided. Answers to some of the questions concerning oil pollution, directed by Antarctic Treaty governments to SCAR, are provided in the Report of the XIth Antarctic Treaty Consultative Meeting, which is partly reproduced here.

J-31592
Nowlin, W.D., Jr., Worley, S.J., Whitworth, T., III, **Methods for making point estimates of eddy heat flux as applied to the Antarctic Circumpolar Current,** *Journal of geophysical research,* Mar. 20, 1985 90(C2), p.3305-3324, 18 refs.

Yearlong current and temperature measurements in Drake Passage were used in this study. Misleading results can be produced by an assortment of mal- and misfeasances which must be overcome: failure to correct measurement errors; insufficient consideration given to the time series studied and the coordinate system used; moorings blown over; low-frequency contamination of eddy heat fluxes. These are discussed at length and their effects on the various aspects of eddy heat fluxes are examined. Comparison with earlier measurements in the area shows considerable differences. However, other evidence indicates that a legitimate large interannual variability cannot be discounted.

J-31613

Rohardt, G., Augstein, E., **Hydrography at the edge of Filchner Ice Shelf** [Hydrographie vor dem Filchner Schelfeis], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.50-57, In German with English summary. 3 refs.

Hydrographic measurements along the front of the Filchner Ice Shelf confirm earlier Norwegian findings. Near Filchner Station they show a relatively warm water mass which is trapped by cold ice shelf water to the east and west. Data from the eastern part of the Filchner depression support the circulation model of earlier investigators. The 26 hour record of a station at the ice edge with two hourly CTD profiles reveals a clear semidiurnal tidal signal in the temperature measurements. (Auth.)

J-31637

Nemoto, T., **Ecological system of antarctica** [Nankyokukai no seitaikei], *Chiri,* March 1983 38(3), p.33-44, 9 refs., In Japanese.

As a water mass enveloping the antarctic continent, the Antarctic Ocean forms a peculiar ecological system. In general, the Antarctic Ocean can be thought of as the ocean between the Antarctic Convergence and Antarctica. Further, the ocean region between the Antarctic Convergence and Subantarctic Convergence is called Subantarctic Ocean. The region south of the Subtropical Convergence is called southern ocean, which lies south of 40 degrees S. latitude. With the Antarctic Convergence as the boundary, the Antarctic Ocean displays a remarkably low temperature, and owing to the melting of the ice, it becomes of low salinity in summer, and the nutrient salts such as silicate, phosphate, and nitric acid increase. The special characteristics of the structure and environment of the Antarctic Ocean are described, and details on the primary productivity, phytoplankton, zooplankton, marine birds, mammals, and the ecological food chain of the Antarctic Ocean are presented.

J-31642

Williams, D.F., Healy-Williams, N., Leschak, P., **Dissolution and water-mass patterns in the Southeast Indian Ocean, Part 1: Evidence from Recent to Late Holocene foraminiferal assemblages,** *Geological Society of America. Bulletin,* Feb. 1985 96(2), p.176-189, 51 refs.

A quantitative study of the planktonic foraminiferal fauna and various related parameters in more than 100 surface sediment samples from the Southeast Indian Ocean has identified the major relationships which can be utilized to reconstruct past changes in water-mass boundaries and degree of CaCO3 dissolution. The samples represent Recent to late Holocene sedimentation in water depths from <1,000 to more than 5,000 m and from 30S to 65S latitude. The transitions between the Antarctic fauna and Subantarctic fauna and the transitional-subtropical fauna, accurately reflect the water-mass boundaries of the Polar Front and Subtropical Convergence, respectively, and provide useful indicators for paleoceanographic reconstructions. (Auth. mod.)

J-31643

Williams, D.F., Gribble, D., Healy-Williams, N., Leschak, P., **Dissolution and water-mass patterns in the Southeast Indian Ocean, Part 2: The Pleistocene record from Brunhes to Matuyama age sediments,** *Geological Society of America. Bulletin,* Feb. 1985 96(2), p.190-202, Refs. p.202.

Calcium carbonate dissolution patterns were determined for portions of the past 2.5 m.y. in 9 *Eltanin* piston cores distributed along the Southeast Indian Ridge in the Southeast Indian Ocean. Oxygen isotope and foraminiferal faunal records were used to determine the relationship between paleoclimate water-mass changes and the dissolution invervals. CaCO3 dissolution was generally more intense during glacial periods, but dissolution pulses of short duration also occur during several interglacial periods, particularly on the shallower portions of the Southeast Indian Ridge. The glacially related increases in dissolution are in-phase with northern migrations of the Polar Front. During the past 250,000 yr, the Polar Front has migrated to 45S latitude in the region south of Australia and as far north as 40S in the mid-southern Indian Ocean during the same time period. (Auth. mod.)

J-31644

Amonskiĭ, E.L., Sarukhanian, E.I., Smirnov, N.P., **Surface circulation in the southern ocean on the basis of the data of drifting GARP buoys,** *Akademiia nauk SSSR. Doklady. Earth science sections,* Jan. 1985 271(1-6), p.210-214, For Russian original see 13J-28670. 15 refs.

Data from drifting buoys around Antarctica are analyzed. The distribution of mean vectors of the ocean's surface circulation during Jan.-March and Nov. of 1979, and June-Aug. of the same year, is shown. An increase in current intensity was observed during the winter season, especially in the Pacific Ocean.

J-31663

Enikeev, V.Kh., Seidov, D.G., **Numerical model of the circulation and paleocirculation of the southern ocean** [Chislennoe modelirovanie tsirkuliatsii i paleotsirkuliatsii IUzhnogo okeana], *Antarktika; doklady komissii,* 1985 No.24, p.128-142, In Russian. 19 refs.

A model of global oceanic circulation, numerical experiments based on calculations of past and present southern ocean climate, and numerical modelling of hydrophysical fields of the southern ocean are discussed and illustrated.

J-31717

Apel, J.R., Wilson, W.S., **Review of major scientific results from U.S. satellite altimetry and projections for the future,** *Marine geophysical researches,* 1984 7(1/2), p.1-16, 12 refs.

Precision radar altimeters have been flown on three U.S. satellites during the past decade. The initial purpose of the altimeter was to relate the topography of the sea surface to currents and other oceanographic parameters. However, other geophysical fields have been derived as well, among them the marine geoid, marine gravity anomaly, surface wave heights, surface swell heights, and surface wind fields. Additionally, the altimeter has been used to deduce distributions of tidal amplitudes, the position of sea ice around the antarctic continent and topography of the Greenland Ice Cap. (Auth.)

J-31718

Cheney, R.E., **Applications of satellite altimetry to oceanography and geophysics,** *Marine geophysical researches,* 1984 7(1/2), p.17-32, 19 refs.

Using all available Geos-3 and Seasat altimeter data, mean sea surfaces and geoid gradient maps have been computed for the Bering Sea and the South Pacific. When enhanced using hill-shading techniques, these images reveal in graphic detail the surface expression of seamounts, ridges, trenches, and fracture zones. Existing models and data have been used to derive realistic global circulation solutions. (Auth. mod.)

J-31719

Engelis, T., Rapp, R.H., **Global ocean circulation patterns based on Seasat altimeter data and the GEML2 gravity field,** *Marine geophysical researches,* 1984 7(1/2), p.55-67, 15 refs.

The Seasat altimeter data has been completely adjusted by a crossing arc technique to reduce the crossover discrepancies to approximately 30 cm in five regional adjustments. This data was then used to create sea surface heights at 1 deg intersections in the ocean areas with respect to the GRS80 ellipsoid. A geoid corresponding to these sea surface heights was computed, based on the potential coefficients of the GEML2 gravity field up to deg 6, augmented by Rapp's coefficients up to deg 180. The differences between sea surface heights and the geoid were computed to give approximate estimates of sea surface topography. The direction of current flow can be computed on a global basis using the spherical harmonic expansion of the sea surface topography. This has been done, not only for Seasat/-GEML2 estimates, but also of the two solutions are very similar and agree well with the major circulation features of the oceans. (Auth. mod.)

See also:
A-31031 A-31429 B-28976 B-29081 B-29088 B-29091 B-29343
B-29374 B-29385 B-29457 B-29458 B-29459 B-29460 B-29461
B-29462 B-29511 B-29595 B-29686 B-29721 B-29832 B-29843
B-29942 B-29943 B-29944 B-29945 B-29946 B-30126 B-30298
B-30315 B-30338 B-30534 B-30535 B-30536 B-30540 B-30739
B-30786 B-30833 B-30888 B-30889 B-30890 B-30891 B-30892
B-30893 B-30894 B-30896 B-30898 B-30899 B-30902 B-31008
B-31082 B-31134 B-31141 B-31142 B-31177 B-31193 B-31214
B-31215 B-31327 B-31328 B-31383 B-31511 B-31697 B-31744
B-31745 B-31746 B-31747 B-31748 B-31749 B-31750 C-30764
E-28963 E-28973 E-29041 E-29120 E-29216 E-29446 E-29453
E-29454 E-29570 E-29588 E-29591 E-29619 E-29620 E-29621
E-29622 E-29623 E-29624 E-29793 E-29866 E-29868 E-29903
E-30258 E-30416 E-30519 E-30522 E-30523 E-30525 E-30527
E-30729 E-30732 E-30745 E-30915 E-30916 E-30962 E-30963
E-31150 E-31163 E-31164 E-31394 E-31407 E-31433 E-31439
E-31473 F-29201 F-29439 F-29471 F-29478 F-29594 F-29876
F-29976 F-30097 F-30181 F-30263 F-30317 F-30323 F-30437
F-30488 F-30733 F-30744 F-31172 F-31174 F-31427 F-31462
F-31647 F-31706 G-29406 G-30870 G-31521 G-31530
G-31538 I-29102 I-29187 I-29934 I-30069 I-30104 I-30184
I-30700 I-31069 I-31102 I-31104 I-31111 I-31112 I-31430
I-31502 L-29119 L-29590 L-31442 L-31614 M-30547 M-30995

K. ATMOSPHERIC PHYSICS

K-28982

Mansurov, S.M., Mansurova, L.G., Mansurov, G.S., Okulova, L.S., Papitashvili, V.O., **Catalogue of polarity determinations for the interplanetary magnetic field sectors for 1979 and 1980** [Katalog opredeleniia poliarnosti sektorov mezhplanetnogo magnitnogo polia za period 1979-1980 gg], *Antarktika; doklady komissii,* 1982 No.21, p.189-193, In Russian. 4 refs.

Evaluation of seasonal influence on polarity of the interplanetary magnetic field sectors was made at the high-latitude observatories Vostok, Resolute and Thule. Values of the vertical component of the geomagnetic field are tabulated by daily (Greenwich time) variations and type for 1979 and 1980. A brief description of the structural dynamics of the interplanetary magnetic field sectors is given.

K-28998

Stubbs, L.C., Boyd, J.S., Bond, F.R., **Measurement of the OH rotational temperature at Mawson, East Antarctica,** *Planetary and space science,* Aug. 1983 31(8), p.923-932, 36 refs.

Measurements of the hydroxyl rotational temperature for the (8.3) meinel band are reported for observations made at Mawson, East Antarctica (67 deg 36 min S, 62 deg 53 min E) over the austral winter of 1979. Mean values of the rotational temperature are given for 54 nights. The average value lies in the range 160-170 K. The measured temperatures appear lower than those that have been reported at similar latitudes in the Northern Hemisphere. A gradual decrease in the value of the temperature throughout the course of the evening is the only diurnal trend observed. There is little evidence for any impulsive heating associated with auroral activity. (Auth.)

K-29000

Brittain, R., Kintner, P.M., Kelley, M.C., Siren, J.C., Carpenter, D.L., **Standing wave patterns in VLF hiss,** *Journal of geophysical research,* Sep. 1, 1983 88(A9), p.7059-7064, 15 refs.

Observations have been made of systematic patterns in VLF hiss, which can be interpreted as a standing wave pattern formed by reflection in the lower ionosphere. Multicomponent VLF electric and magnetic field experiments were flown on three sounding rockets from Siple Station during December 1980 to January 1981. One feature of the natural emissions was observed in a very similar form during each flight. A band of hiss, typically from 1.5 to 3 kHz, was seen on the upleg to form a series of closely spaced stripes with whistler-like dispersion. These first appeared at an altitude of 90-95 km and extended for as much as 40 km in altitude. On the downleg the stripes were observed at the same altitude with the pattern reversed in time. No such patterns were observed by the VLF receivers operating at the same time on the ground at Siple or at its conjugate point. It is suggested that the patterns are interference effects due to downcoming waves reflecting from a layer in the E region and forming a standing wave pattern. (Auth.)

K-29001

Kintner, P.M., Brittain, R., Kelley, M.C., ***In situ* measurements of transionospheric VLF wave injection,** *Journal of geophysical research,* Sep. 1, 1983 88(A9), p.7065-7073, 24 refs.

VLF waves at 3.85 kHz from the Siple, Antarctica, transmitter were continuously measured by electric and magnetic receivers on a sounding rocket as the waves propagated through the neutral atmosphere and into the ionosphere. The change from linear to circular polarization was clearly observed along with severe attenuation of the VLF signal in the D region. Interferometric measurements established the index of refraction and provided an independent calibration of the rocket-borne receivers. (Auth.)

K-29151

Tabocchini, H.L., Cazeneuve, H.A., Pirán, M.M., **Coupling between magnetic activity and ionospheric absorption** [Acoplamiento entre la actividad magnética y la absorción ionosférica], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.284, 11p., In Spanish with English, French and German summaries. 5 refs.

The coupling between ionospheric regions, studied by spectral analysis and cross correlation, was found to be subject to complex variations. The discontinuities and the different levels of power that characterize the spectra are produced by the absorbed or liberated power in the magnetic or absorption events. (Auth.)

K-29152

Cazeneuve, H., Tabocchini, H.L., Pirán, M.M., **Influence of the interplanetary environment on auroral zones** [Regulación ejercida por el medio interplanetario en la zona auroral], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.285, 17p., In Spanish with English, French and German summaries. 10 refs.

The relationship among interplanetary conditions, magnetic activity and ionospheric absorption, recorded at Belgrano Station, is examined. Magnetograms of the horizontal component (H), riometer records and data of the interplanetary medium are used. It is found that the magnetic activity is generated by the combined effect of a variety of interplanetary conditions. The data indicate that each physical entity of the interplanetary medium plays a specific and precise role in the development of the active periods. Although the interaction among such diversified phenomena is unknown, it is inferred that the geomagnetic activity is a speedy response to variations of interplanetary conditions. (Auth.)

K-29168

Prölss, G.W., **VLF atmospherics measurements at Georg von Neumayer Station in the Antarctic** [VLF-Atmospherics Messungen an der Georg-von-Neumayer-Station in der Antarktis], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.45-48, In German.

The atmospherics program is briefly sketched in terms of facilities and equipment available for the research, some of the problems expected and methodology. Some preliminary data are given.

K-29219

Kamada, T., **On the observation of conjugate points,** *Polar news,* Aug. 1983 No.37, p.27-30, In Japanese. 3 refs.

In this paper is described the importance of the observation of geomagnetic conjugate points, especially the aurora and its related phenomena. Because of the complexity of conjugacy of natural phenomena observed at the conjugate point, some examples having symmetric and/or asymmetric phenomena observed by many workers are shown. A long recognized need among Japanese researchers for conjugate observation of auroral related phenomena was realized with the establishment of the National Institute of Polar Research in Japan in September, 1973. Thereafter, much data about conjugacy were obtained. Finally, the author proposed to establish a stationary observation base in Iceland in the near future for conjugacy study, because Showa Station (Mag. Lat. -66.7, Mag. Long. 72.5) in Antarctica and Leirvogur (Mag. Lat. 66.6, Mag. Long. 71.2) in Iceland are the only conjugate pair points for an aurora and its related phenomena. (Auth.)

K-29393

Broom, S.M., **New ionosonde for Argentine Islands ionospheric laboratory, Faraday Station,** *British Antarctic Survey. Bulletin,* Feb. 1984 No.62, p.1-6, 6 refs.

An IPS-42 ionosonde was deployed at the ionospheric observatory of Argentine Islands, Faraday Station in January 1983. It replaces the Union Radio Mark II ionosonde previously used for data collection. This paper describes the characteristics of the new ionosonde and the aerial array used. (Auth.)

K-29411

Carpenter, D.L., Miller, T.R., **Rare ground-based observations of Siple VLF transmitter signals outside the plasmapause,** *Journal of geophysical research,* Dec. 1, 1983 88(A12), p.10,227-10,232, 20 refs.

Signals from the Siple VLF transmitter observed at the conjugate ground station, Roberval, Canada, have previously been found to propagate either within the outer plasmasphere or within the region of steep plasmapause density gradients, but on paths with equatorial electron density that is within a factor of 2 of nearby plasmaspheric levels. Two cases in which propagation occurred just outside the plasmapause and at plasma trough density levels are reported. In one case a series of 1-s pulses and frequency ramps was observed; many of the pulses triggered risers with slopes of 10 kHz/s, much steeper than those usually observed within the plasmasphere. In the other case, no evidence of triggered emissions was seen on the Siple pulses, but instead efficient echoing occurred and noise band precursors to large wave bursts were initiated. (Auth.)

K-29430

Papitashvili, V.O., Mansurov, S.M., **Separation of polar geomagnetic field variations into natural orthogonal components, and their connection with the interplanetary magnetic field** [Razdelenie variatsiĭ geomagnitnogo polia v poliarnykh oblastiakh na estestvennye ortogonal'nye sostavliaiushchie i ikh sviaz' s mezhplanetnym magnitnym polem], *Antarktika; doklady komissii,* 1980 No.19, p.188-197, In Russian. 14 refs.

A method of analysis of polar geomagnetic field variations, applied to data for both hemispheres in the summer of 1965, is described. Good agreement of equivalent currents, synthesized by the first natural component, is found. Calculations show the existence of opposite polar electrojets at 75 to 80 deg lat, which is confirmed by direct measurements in Antarctica. A north-south asymmetry in these electrojets is detected.

K-29431

Mansurov, S.M., Mansurova, L.G., Okulova, L.S., **Catalog of polarities of interplanetary magnetic field sectors for the period 1977-1978** [Katalog opredeleniĭ poliarnosti sektorov mezhplanetnogo magnitnogo polia za period 1977-1978 gg], *Antarktika; doklady komissii,* 1980 No.19, p.198-201, In Russian. 11 refs.

Daily determinations of the predominant polarity of the interplanetary magnetic field (IMF), based on geomagnetic field variations studied at various polar stations, are presented. The example o American satellite investigations of the three-dimensional structure o boundaries of the IMF sectors, confirm the usefulness of uninterrupted sequences of terrestrial data on the polarity of IMF sectors.

K-29437

Sengupta, A., **Radiowave transmission characteristics in Antarctica,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.46-52, 2 refs.

Preliminary results of studies on radio propagation in the upper atmosphere during the First Indian Antarctic Expedition are reported. The studies were mainly on high latitude D-region using VLF observation, atmospheric radio noise, VHFTV signal propagation, HF propagation and communication aspects. (Auth.)

K-29448

Iyengar, R.V., Rajaram, R., **Preliminary study of antarctic magnetic data,** Indian Expedition to Antarctica, 1st. Scientific report, New Delhi, Department of Ocean Development, 1983, p.130-135, 7 refs.

The preliminary survey showed the following basic features of th magnetic field variations at *Dakshin Gangotri:* 1. The magnetic fiel exhibits rapid fluctuations in a wide range of frequencies, from magnetic pulsations to diurnal variations. 2. Fluctuations range from ten of minutes to diurnal periodicities. 3. Graphs depicting F variation at *Dakshin Gangotri* and H records at a permanent station in India for two time intervals, show that the coupling between the polar an the equatorial regions is complete. 4. The large variations in F associated with these events can be observed only in the auroral regions

K-29472

Helliwell, R.A., **Controlled stimulation of VLF emissions from Siple Station, Antarctica,** *Radio science,* Nov.-Dec. 1983 18(6), p.801-814, 21 refs.

Active VLF experiments at Siple Station are reviewed and ne findings on the role of wave coherence using the new two-frequency transmissions are reported. The primary purpose of Siple Station i to perform active experiments on VLF wave-particle interactions An important part of the program is the observation and interpretation of various VLF wave phenomena, including whistlers, chorus and hiss Related programs at Siple Station include riometers, geomagneti pulsations, ULF waves, photometers, and balloons and rockets. Recently a digital ionosonde was placed in operation at Siple. All ar coordinated in a program aimed at describing the behavior of th magnetosphere-ionosphere system and understanding its role in th generation of waves and wave-particle interactions.

K-29473

Dudeney, J.R., Rodger, A.S., Jarvis, M.J., **Radio studies of the main F region trough in Antarctica,** *Radio science,* Nov.-Dec. 1983 18(6), p.927-936, 24 refs.

Case studies of the equatorward movement of the main F-regio trough are presented, using data recorded by a digital ionospheri sounder located at Halley Bay (76 S, 27 W; lambda=61.8, L=4.2) Three events were chosen to give a range of magnetic conditions an local times. Comparison of the results, projected into the equatoria plane, with theoretical predictings of the simple "teardrop" model o the plasmapause is presented. (Auth.)

K-29474

Rodger, A.S., Morrell, C., Dudeney, J.R., **Studies of sporadic E associated with the main ionospheric trough,** *Radio science,* Nov.-Dec. 1983 18(6), p.937-946, 40 refs.

The occurrence of sporadic E under the main F-region trough has been established using ionograms from a vertical incidence ionosonde at Halley Bay, Antarctica (76 S, 27 W; L=4.2), a site well suited for such studies as the trough can be seen under a wide range of magnetic conditions and local times. Analysis shows that Es is very frequently observed under both the equatorward and poleward edges of the trough, as well as poleward of it. Additional information on the morphology, and dynamics of Es layers associated with the main trough is provided by detailed study of individual events using data from the British Antarctic Survey's advanced ionospheric sounder deployed at Halley Bay. (Auth.)

K-29479

Babino, M.E.G. de, **Computation of magnetic effects of a vortical current** [Métodos de cálculo de los effectos magneticos de una corriente vorticosa], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1983 No.179, 20p., In Spanish with English, French and German summaries.

Programs allowing determination in a fixed point of the H and Z components of the magnetic field produced by a spiral circulation, its center describing several plain curves, are presented. The development of the magnetic field in polynomials of Legendre is used in the determination. Graphs obtained as an output of the programs developed are included. (Auth.)

K-29653

Troitskaia, V.A., Bol'shakova, O.V., **Geomagnetic pulsations in the polar cusp** [Geomagnitnye pul'satsii v poliarnoĭ shapke], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.93-101, In Russian. 12 refs.

Geomagnetic pulsation studies carried out by Soviet scientists stationed in northern and southern polar regions are reported. Principal attention is paid to new types of fluctuation observed in the polar cusp in the low-frequency and high-frequency ranges of the spectrum. These fluctuations differ substantially from known types of geomagnetic pulsations typical of the auroral zone in middle latitudes.

K-29654

Besprozvannaia, A.S., Shirochkov, A.V., Shchuka, T.I., **Synoptic model of ionospheric anomalies in high latitudes of the Southern Hemisphere from surface measurements** [Sinopticheskaia model' anomal'nykh iavleniĭ v ionosfere vysokikh shirot iuzhnogo polushariia, po dannym nazemnykh izmereniĭ], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.101-110, In Russian. 30 refs.

On the basis of established regularities in the occurrence of ionospheric anomalies in the Northern Hemisphere, data from ionospheric measurements in high latitudes in the Southern Hemisphere were analyzed. Synoptic maps of antarctic ionosphere anomalies, plotted in winter during intense solar activity, are presented. Ionospheric properties, linked with particle precipitations in auroral zones and with the influence of interplanetary magnetic field in the polar cusp area, are determined.

K-29667

Francis, C.R., Strangeways, H.J., Bullough, K., **Discrete VLF emissions (7-9kHz) displaying unusual banded and periodic structure,** *Planetary and space science,* May 1983 31(5), p.537-557, 51 refs.

Rising frequency VLF emissions having unusually high frequency and exhibiting banded structure were recorded between 14.55 and 15.30 U.T. on 28 June 1972 by the VLF goniometer receiver at Halley, Antarctica. The risers were split into two frequency groups, one with frequencies in the range 6.0-7.7 kHz and the other with frequencies between 7.8 and 9.4 kHz, the former being more numerous. The gap between the lower and upper frequency risers is superficially similar to, though at a higher frequency than, the missing bands in emissions observed by satellites. However, it is found to be unlikely that the risers received at Halley can be explained by any of the mechanisms advanced to explain the banded satellite-observed emissions. Several other explanations are considered and it is shown that the most likely is partial suppression by magnetospheric line radiation propagating in the same duct. The risers are interpreted as being generated via cyclotron resonance with counterstreaming electrons. A computer program based on Helliwell's (1967) phenomenological theory is used to determine the generation region and electron energies involved. (Auth.)

K-29670

Jones, D., **Antarctic research by satellite link,** *Nature,* Jan. 1984 307(5946), p.12-13.

Steps taken to transmit scientific data from Halley Station to Cambridge, England, via an INMARSAT geostationary communications satellite, are reported and the data processing is described.

K-29704

Olson, J.V., **Signal detection in scalar arrays: application of adaptive, pure-state filters to infrasonic array data,** *Annales geophysicae,* July-Oct. 1983 1(4-5), p.371-373, 6 refs.

The performance of pure-state filters in signal detection was investigated, using data from an array of infrasonic microphones operated at Windless Bight, Antarctica by the Geophysical Institute, University of Alaska. In surveys of data spanning several months the number of coherent signals detected when pure-state filters were used increased by more than a factor of ten compared with unfiltered analysis of the same data. The process is so general in application that it is used regularly in both on-line and off-line analysis of the data. In off-line analysis the efficacy of other signal detection techniques, such as beam-steering and *f-k* analysis, is found substantially improved when the data are pure-filtered prior to the analysis. (Auth.)

K-29736

Mansurov, S.M., Zaĭtsev, A.N., Papitashvili, V.O., **Geomagnetic data from the project "Geophysical polygon in Antarctica"** [Geomagnitnye dannye po proektu "Geofizicheskiĭ poligon v Antarktide"], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyĭ biulleten',* 1983 Vol.103, p.61-65, In Russian. 6 refs.

Geomagnetic measurements carried out at 15 stations in Antarctica between 1975 and 1979 are reviewed and the results are tabulated. These data afford a unique opportunity for detailed study of the Earth's magnetic field variations in the polar cusp of the Southern Hemisphere. Analysis of the data is now in progress.

K-29743

Paschal, E.W., Helliwell, R.A., **Phase measurements of whistler mode signals from the Siple VLF transmitter,** *Journal of geophysical research,* Mar. 1, 1984 89(A3), p.1667-1674, 14 refs.

A digital signal processing program has been developed to measure the phases of coherent VLF signals from analog tape recordings made in the field. The program uses a constant frequency pilot tone recorded with the VLF data to correct tape speed errors and reconstruct the signal phases. We analyze several examples of whistler mode signals from the VLF transmitter at Siple Station, as received at Roberval, Quebec. Pulses with temporal growth show a relative phase advance with time, and thus a positive frequency offset from the transmitted signal, often from the beginning of the pulse. Amplitude beating is often seen toward the end of a pulse, sometimes with phase cycle-skipping as the emission becomes unlocked from the input signal. Current theories of wave-particle interaction are reviewed and found to explain some of the observed signal features, though no theory predicts the initial frequency offset of a growing pulse. (Auth.)

K-29744

Eather, R.H., **Dayside auroral dynamics,** *Journal of geophysical research,* Mar. 1, 1984 89(A3), p.1695-1700, 10 refs.

Keogram cameras operated at South Pole during 1980 and 1981 have monitored the position, intensity, color, and dynamic behavior of dayside aurora. The position of the midday aurora for very quiet magnetic conditions is some 5 deg further poleward than was previously recognized. The average energy of dayside electron precipitation (about 100 eV) does not change as magnetic activity increases. Rapid latitudinal movements of discrete dayside aurora structures and pulsating structures with Pc 5 periodicities are regularly observed and have no obvious explanation in terms of interplanetary field conditions. (Auth.)

K-29746

Lee, M.C., Kuo, S.P., **Excitation of magnetostatic fluctuations by filamentation of whistlers,** *Journal of geophysical research,* Apr. 1, 1984 89(A4), p.2289-2294, 16 refs.

The thermal filamentation instability of whistlers that can excite magnetostatic and plasma density fluctuations simultaneously has been investigated for cases in the magnetosphere and in the ionosphere. With the available facilities at Siple Station this instability may be excited in the magnetosphere at L = 4 within a few minutes by ducted whistler modes whose frequencies are greater than half the local electron cyclotron frequency. No significant ionospheric effects are expected to be produced by the injected Siple VLF waves. However, marked ionospheric perturbations are predicted with employment of envisioned MF transmitters at frequencies slightly less than the electron cyclotron frequency in the ionosphere. (Auth.)

K-29850

Salzer, D.T., **L-band satellite communication experiment in the Antarctic** [L-Band-Satellitenkommunikationsexperiment in der Antarktis], *Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt. Forschungsbericht,* Aug. 1982 DFVLR-FB 82-24, 34p., N84-12356/1, In German with English summary. 4 refs.

This report describes a satellite communication experiment performed in 1980 in the Antarctic. A satellite receiving station, installed at the Argentinian antarctic station General Belgrano II was used. The measurement signal was the L-band beacon from the Atlantic Ocean MARISAT Satellite. The elevation angle was approximately 3 deg. The results show unexpectedly high variations of the amplitude of the received signal which strongly influence satellite communications in this antarctic region. Due to the daily and seasonal variations of the amplitude and frequency of the received signal, the ionosphere could be the origin of these effects. (Auth.)

K-29907

Jones, D., Lefeuvre, F., Parrot, M., **VLF signal recognition by cross-spectral analysis,** *Annales geophysicae,* May/June 1983 1(3), p.253-258, 8 refs.

Considerable effort has been expended in the past in the design of wave experiments to reduce demands on the telemetry link. A major step forward in this direction was the inclusion of a digital correlator in the wave experiment on the GEOS spacecraft, which allowed the on-board computation of auto-correlation and cross-correlation functions. The correlation functions are Fourier transformed on ground to produce spectrograms of good quality which have been widely used in investigations of magnetospheric plasma waves by GEOS 1 and 2. Computer simulations of the correlator's performance prior to flight indicated that certain information in the cross-correlogram could possibly be utilized to great advantage in the recognition of polarized signals, even in the presence of substantial noise. The suggestion entailed the use of the cross-spectral phase, and in particular its stationarity with time, to extract the signal. The technique has now been tested on natural VLF emissions recorded on GEOS 1 and the results are encouraging. The potential of the method for distinguishing signal from noise and for displaying wave propagation characteristics is illustrated using VLF hiss and chorus observed on GEOS 1. (Auth. mod.)

K-29965

Cahill, L.J., **Observation of an oscillating magnetic field shell at three locations,** *Journal of geophysical research,* May 1, 1984 89(A5), p.2735-2744, 28 refs.

On July 14, 1982, 1830-1930 UT, a complex magnetic pulsation event was observed near the magnetic shell L about 4.5 in the local afternoon. A large magnetic storm was in progress and had proceeded to the early recovery phase. The event began, at 1832 UT, with a sudden decrease in /B/ and a brief, 120-s compressional pulsation. A transverse pulsation then developed with period near 180-s and amplitude about 5 nT. Near 1850 UT this pulsation decreased abruptly and was replaced by a 44-s transverse pulsation. By 1858 UT the 44-s pulsation was fading and a 240-s azimuthal pulsation developed rapidly. It slowly decreased in amplitude after 1910 UT and was gone by 1930 UT. The event was observed at the DE-1 satellite near the equator in both electric and magnetic field components and at the ground magnetic observatories Siple, Antarctica, and Roberval, Quebec, 15 to 30 deg west of DE-1 and at opposite ends of an L = 4.2 field line. (Auth. mod.)

K-29966

Sato, N., **Short-period magnetic pulsations associated with periodic VLF emissions (T about 5.6 s),** *Journal of geophysical research,* May 1, 1984 89(A5), p.2781-2787, 17 refs.

One-to-one correlation between periodic VLF emissions and short-period magnetic pulsations was found at Showa Station on August 8, 1981. The periodic VLF emissions were observed under extremely quiet geomagnetic conditions. Fortunately, the periodic VLF emissions were recorded simultaneously on the ground at Showa and on the ISIS 2 satellite. From the ground data, the intensity of the H component of magnetic pulsations associated with the periodic VLF emissions is about 0.02 nT, approximately 5 times larger than that of the D component of magnetic pulsations. Magnetic pulsations associated with the periodic emissions have constant frequency and show a "linelike" frequency-time spectrum. The amplitude of magnetic pulsations observed at Mizuho Station is approximately one quarter that at Showa. The periodic enhancements of conductivity in the ionospheric D and E regions would modify the current flows in the ionosphere, resulting in the magnetic variations observed on the ground. (Auth. mod.)

K-29967

Sonwalkar, V.S., Bell, T.F., Helliwell, R.A., Inan, U.S., **Direct multiple path magnetospheric propagation: a fundamental property of nonducted VLF waves,** *Journal of geophysical research,* May 1, 1984 89(A5), p.2823-2830, 23 refs.

ISEE 1 satellite observations of nonducted whistler mode signals from the Siple Station VLF transmitter show that all well-defined pulses are elongated by 20 ms to 200 ms. This elongation is attributed to closely spaced multiple paths of propagation between the ground and the satellite. The presence of multiple paths is further confirmed by the observed amplitude fading pattern where fading occurs not only at half the spin period (1.52 s) of the rotating antenna, but also at time scales of the order of 1 s. Electric field measurements show a 2 to 10-dB amplitude variation, which is again consistent with direct multiple path propagation. The results are illustrated with two cases: one on October 29, 1977, inside the plasmapause and the other on May 7, 1979, outside the plasmapause. The results establish that, in general, at any point in the magnetosphere the direct signals transmitted from the ground arrive almost simultaneously along two or more closely spaced direct ray paths. We discuss the implications of our results for nonducted wave-particle interaction in the earth's magnetosphere. (Auth. mod.)

K-29980

Sato, N., Fuji, R., Fukunishi, H., Nakajima, D., **Upper atmosphere physics data, Syowa Station, 1981,** *Japanese Antarctic Research expedition. JARE data reports,* Mar. 1984 No.93, 206p., 1 refs.

Summarized upper atmosphere physics data, measured by the *Upper Atmosphere Physics* monitoring system at Showa Station in 1981, are presented. The following parameters are given: geomagnetism, ELF-VLF emissions, ionosphere, and optical aurora. Continuous computer plots of magnetograms from April through December 1981, and frequency-time spectra of the H component of magnetic pulsations in the frequency range of DC-1 Hz, are included in Appendix 1 and 2, respectively.

K-30018

Troshichev, O.A., **Polar magnetic disturbances and field-aligned currents,** *Space science reviews,* 1982 32(3), p.275-360, Refs. p.357-360.

DLC QB1.S77

The results of research of the morphology and physics of polar magnetic disturbances and their relation to three-dimensional magnetospheric currents are reviewed. Magnetic disturbance current systems are examined, as well as their relation to solar wind parameters and magnetic activity level and their seasonal dependence. On the basis of numerical model calculations, it is shown that magnetospheric field-aligned currents observed by the TRIAD and ISIS-2 satellites are the main generation mechanism of high-latitude magnetic disturbances. Plasma pressure gradients are examined as a source of energy for driving field-aligned currents in the closed magnetosphere. (Auth.)

K-30034

Igarashi, K., Kuratani, Y., **Records of radio aurora at Syowa Station, Antarctica in 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Jan. 1984 No.88, 28p.

Observation of ionospheric irregularities has been carried out at Showa Station by means of an auroral radar since March 1966. This report includes the periods of radio auroral echoes detected in 1982 and characteristic examples of echo intensity-time variation. (Auth.)

K-30036

Kuratani, Y., Igarashi, K., **Riometer records of 30MHz cosmic noise at Syowa Station, Antarctica in 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Jan. 1984 No.87, 86p.

Observations of cosmic radio noise with a standard riometer (relative ionospheric opacity meter) at 30 MHz have been carried out at Showa Station since February of 1966 by members from the Radio Research Laboratories. This report includes hourly values and chart records of cosmic noise absorption from January 1 to December 31, 1982. (Auth.)

K-30112

Morrell, C., **Sporadic *E(Es)* associated with the main ionospheric trough observed over Halley Station, Antarctica,** *British Antarctic Survey. Bulletin,* May 1984 No.63, p.1-18, Refs. p.16-18.

The occurrence of sporadic *E (Es)* under the main ionospheric trough is investigated using vertical incidence ionosonde data from Halley Station, Antarctica. This is an ideal location for such studies as the trough is seen over a wide range of magnetic conditions and local times. The study reveals that, before magnetic midnight, *Es* layers with semi-thickness similar to that of the normal day-time *Es* layer are observed most frequently whereas, after midnight, the *Es* layers are ususally much thinner. It is argued that the source of the additional ionization in the *E* region is most likely to be proton precipitation before magnetic midnight but electron precipitation thereafter. A simple method is used to estimate the fluxes and energies of the precipitating charged particles necessary to produce the observed *Es* layers. It is suggested that the observed change in the *Es* layer thickness about midnight is related to the difference in the type and energy spectrum of the precipitating particles. The effects of transport processes in the *E* region are briefly considered but no conclusions drawn concerning them; it is suggested that redistribution of ionization by the convection (dawn-dusk) electric field may be important during disturbed conditions. (Auth.)

K-30130

Sato, N., Fukunishi, H., Kokubun, S., Saemundsson, T., **Report of the 1983 conjugate campaign in Iceland,** *Antarctic record,* March 1984 No.81, p.102-119, In Japanese with English summary.

The study takes advantage of the geographical condition that the conjugate points of Showa, Mizuho and Molodezhnaya Stations in Antarctica are located in the vicinity of Husafell, Isafjördur and Husavik in Iceland. Data recorded at the three conjugate station pairs of Showa-Husafell, Mizuho-Isafjördur, and Molodezhnaya-Husavik, of the temporal and spatial conjugacy of both auroras and wave phenomena associated with auroral particle precipitation is presented. The auroral particle acceleration process in the ionosphere-magnetosphere energy coupling system, as well as the generation and propagation mechanisms of ULF, ELF and VLF plasma waves were also investigated. (Auth. mod.)

K-30147

Boyd, J.S., **Invariant geomagnetic co-ordinates for epoch 1977.25,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Dec. 1983 No.19, 44p., 10 refs.

Invariant geomagnetic co-ordinates were calculated for points on a 5 deg x 5 deg grid over the earth, at altitudes of 105 km and 250 km. The calculation was based on the International Geomagnetic Reference Field (IGRF) for 1975, updated to 1977.25 to correspond approximately to the middle of the International Magnetosphere Survey period. Global charts of the invariant co-ordinates at 105 km altitude are presented. The invariant co-ordinates were expanded into a set of spherical harmonic co-efficients and FORTRAN subroutines are described which allow the rapid re-calculation of the invariant co-ordinates from the co-efficients. (Auth.)

K-30160

National Research Council. Polar Research Board, **Study of the upper atmosphere and near-Earth space: scientific status and recommendations for future directions,** Washington, D.C., National Academy Press, 1982, 42p.

This report by the Ad Hoc Committee on the Upper Atmosphere and Near-Earth Space reviews recent studies published by the National Academy of Sciences on the upper atmosphere. In addition, recommendations are made relevant to basic research in space plasmas and neutral atmosphere physics, applied fields and other disciplines, and recommendations on policy issues.

K-30180

Toroshelidze, T.I., Giorgobiani, V.Sh., **Study of oxygen red line in twilight** [Issledovaniia krasnoĭ kislorodnoĭ linii v sumerkakh], *Poliarnye siianiia i svechenie nochnogo neba,* 1984 No.31, p.124-131, In Russian with English summary. 10 refs.

The results of observations of 6300 Å emission in the twilight are obtained using a tilting-filter photometer in Amsterdam I. in 1976 and at Abastumani in 1977. The lower boundary of detection and position of 6300 Å emission maximum on the twilight curve is shown to be dependent on the O3 content in the atmosphere. The 6300 Å intensities inferred from many-year spectrographic observations during twilight with maximum electron number density in the F2 ionospheric layer are compared. (Auth.)

K-30260

Grafe, A., **Auroras at Novolazarevskaya** [Polarlichter in Novolazarevskaja], *Wissenschaft und Fortschritt,* 1984 34(5), p.128-130, In German. 1 ref.

Experiments in Antarctica in 1976 and 1977 are reviewed and the spectrophotometer, the primary instrument used during the experiments, is described and its operation explained. Emission intensity characteristics of auroras at wavelengths of 391.4 and 557.7nm are discussed and atmospheric conditions conducive to the development of aurora are described and examples shown.

K-30304

Roeder, J.L., **Time series analysis of magnetospheric wave-particle interactions,** Houston, University of Houston, 1982, 216p., University Microfilms order No. 83-00739, Ph.D. thesis. Refs. p.203-216.

Whistler mode wave-particle interaction in the earth's magnetosphere was investigated by a sounding rocket experiment performed at Siple Station. The experiment observed intense bursts of X ray bremsstrahlung produced by precipitating electrons. A time series analysis of the observations concluded that the X ray bursts were significantly correlated with the Roberval VLF intensity in the 2-3 kHz frequency range. The experimental results were compared with theoretical predictions of the time delay between the arrival of the VLF emissions at Roberval and the arrival of the precipitating electrons at Siple. Disagreement between the predicted and observed time delays suggested a separation of the wave generation and electron scattering regions. (Auth. mod.)

K-30313

Stassinopoulos, E.G., Lanzerotti, L.J., Rosenberg, T.J., **Temporal variations in the Siple Station conjugate area,** *Journal of geophysical research,* July 1, 1984 89(A7), p.5655-5659, 10 refs.

The Siple Station conjugate locations in the northern hemisphere are examined for the epoch 1975-1990 according to the predictions of three internal source geomagnetic field models (IGRF 1980, MAGSAT 1980, Barraclough 1975) and one external field model (Mead/-Fairfield) under quiet and disturbed conditions. The conjugate location systematically changes in the interval studied, making it imperative that changes be made in the locations of the northern hemisphere geophysical stations during the reactivation of Siple Station in 1985-1987. (Auth.)

K-30350

Tonegawa, Y., Fukunishi, H., **Harmonic structure of Pc 3-5 magnetic pulsations observed at the Syowa-Husafell conjugate pair,** *Journal of geophysical research,* Aug. 1, 1984 89(A8), p.6737-6748, 23 refs.

Strong evidence for the harmonic structure of Pc 3-5 magnetic pulsations observed on the ground has been provided by extracting coherent oscillations from magnetic pulsation data recorded at the Showa-Husafell conjugate pair near L = 6 and then calculating the phase difference of the H components between the conjugate points as a function of local time. The model calculation suggests that the Pc 4/5 band observed in the frequency range 3-10 mHz is the fundamental mode of standing shear Alfvén waves near L = 6, while the Pc 3 band with multiple harmonic structure observed in the frequency range 20-100 mHz is the higher harmonics (usually third to sixth harmonics). The second harmonic is not notable in comparison with other harmonics. It is found further that the fundamental mode and the higher harmonics are not always excited simultaneously. Therefore it is likely that when the frequency of the external driving source is in the Pc 3 range, it excites higher harmonics of standing shear Alfvén waves near L = 6, while when the frequency of the external driving source is in the Pc 4/5 range, it excites the fundamental mode. (Auth.)

K-30354

Besprozvannaia, A.S., Uvarov, V.M., Shirochkov, A.V., Shchuka, T.I., **Ionospheric E region anomalies in the polar caps** [Anomal'nye iavleniia v oblasti *E* ionosfery poliarnykh shapok], *Ionosfernye issledovaniia,* 1983 No.37, p.91-98, In Russian with English summary. 25 refs.

The basic characteristics and the possible mechanisms of the occurrence of anomalous events in the lower ionosphere over polar caps are studied. Low-intensity electric fields and slow magnetospheric convection are shown to facilitate the formation of the plane Es. It is concluded that the SEC, F-lacuna, and M-absorption events are of the same nature. These events are relevant to the development of the two-flux Farley-Buneman instability in the lower ionosphere.

K-30377

North, G.R., Mengel, J.G., Short, D.A., **Climatic response to a time varying solar constant,** Weather and climate responses to solar variations, edited by B.M. McCormac, Boulder, Colorado Associated University Press, 1983, p.243-255, 16 refs.

DLC QC883.2.S6W43

A prototype global energy model is presented using a time varying solar constant. Equations are derived and the parameters are explained. A two dimensional version is introduced in which the global geographical distribution of land and water is the controlling feature. Model response to three relevant frequences of occurrence is discussed and pictorial representations are shown on graphs which include data for arctic and antarctic regions.

K-30414

Smirnova, N.A., **Fine structure of the ground-observed VLF chorus as an indicator of the wave-particle interaction processes in the magnetospheric plasma,** *Planetary and space science,* April 1984 32(4), p.425-438, Refs. p.437-438.

The results of investigations of chorus type VLF emissions in the subauroral conjugate regions using data from Sogra-Kerguelen laboratories and along the meridional profile near the plasmapause projection are summarized in order to connect the peculiarities of ground-observed VLF chorus with plasma processes in the magnetosphere during substorm development. A method of determining the location of the instability region in the magnetosphere is suggested, based on the measurement of the upper boundary frequency and the ground-observed VLF chorus (UBF-method). The dynamics of chorus spectra during the substorm development are investigated. On the basis of the observed regularities a phenomenological model of the development of the VLF chorus source is constructed. Some magnetospheric plasma parameters such as plasma density, large-scale electric field, etc., are calculated. The calculated and typical measured parameters are shown to be conformable. The diagnostic possibilities of VLF chorus are discussed. (Auth.)

K-30494

Nagata, T., ed, **Proceedings of the sixth symposium on coordinated observations of the ionosphere and the magnetosphere in the polar regions,** *Tokyo. National Institute of Polar Research. Memoirs,* July 1984 Special Issue No.31, 179p., For individual papers see K-30495 through K-30498. Refs. passim.

This volume contains 14 selected contributions among 83 individual scientific papers presented at the symposium, five of which are pertinent to Antarctica. The 14 papers may be classified into the following four groups: Storm sudden commencement phenomena observed at synchronous orbit; ULF-VLF waves in the polar and low latitude regions by ground-based and satellite observations, results of balloon observations carried out at Andöya, Norway and Esrange, Sweden; and practical future plan of the Showa-Iceland conjugate observations. (Auth. mod.)

K-30495

Kuwashima, M., Tsunomura, S., Fukunishi, H., **SSC-associated magnetic variations at the geosynchronous altitude,** *Tokyo. National Institute of Polar Research. Memoirs,* July 1984 Special Issue No.31, p.12-26, 38 refs.

SSC events at the geosynchronous altitude have been studied using the data obtained by satellite, and on the ground at Showa Station for the period 1976-1980. In the compressional component (parallel to the ambient magnetic field direction), the SSC amplitude is very large in the noonside, while it becomes smaller with increasing distance from the noonside and is very small or none in the midnightside. In the transverse component (east-west direction), the direction of the initial movement of Psc changes drastically across the noon and the midnight. The direction is eastward in the morningside, while it is westward in the eveningside. (Auth.)

K-30497

Yamagishi, H., **Auroral zone X-ray pulsations associated with VLF pulsations: B15-3N balloon experiment,** *Tokyo. National Institute of Polar Research. Memoirs,* July 1984 Special Issue No.31, p.124-136, 20 refs.

A stratospheric balloon was launched from Stramsund, Norway, during the recovery phase of a magnetic substorm. The scintillation counter recorded many examples of X-ray microbursts and pulsations at a ceiling altitude of 7 mb (33 km). The ground-based VLF receiver at Andöya, located at 160 km northeast of Stamsund, and at Showa Station, observed polar chorus emissions and quasi-periodic (QP) emissions during the balloon flight. Study of cross correlations between the X-ray and the VLF emissions showed that the X-ray microbursts preceded VLF chorus at Andöya by about 1.7 s, while the VLF chorus at Showa occurred almost simultaneously with the X-ray microbursts. This is qualitatively explained by the nature of counter-streaming type wave-particle interaction and the echoing of whistler mode wave packets in the magnetosphere. X-ray pulsations and rising-tone type QP emissions with periods of 20-30 s showed a good coherency. This similarity suggests that both phenomena are closely related to each other through cyclotron wave-particle interaction in the magnetosphere. (Auth.)

K-30498

Sato, N., Fukunishi, H., Saemundsson, T., **Operation plan for the Iceland-Syowa conjugate campaign in 1983-1985,** *Tokyo. National Institute of Polar Research. Memoirs,* July 1984 Special Issue No.31, p.169-179, 4 refs.

Geomagnetic conjugate points of Showa, Mizuho and Molodezhnaya stations in Antarctica are located in the vicinity of Husafell, Isafjördur Husavik in Iceland. This campaign aims at a further understanding of physical processes in auroras and their related phenomena from coordinated observations of magnetic field variations, magnetic ULF waves, ELF-VLF emission, cosmic noise absorption and spatial and temporal variations of auroras at these three pairs of geomagnetic conjugate stations. This paper gives an outline of the campaign schedule, the location of three observatories to be set up in Iceland and the specifications of facilities. (Auth.)

K-30500

Engebretson, M.J., **On the relationship between morning sector irregular magnetic pulsations and field aligned currents,** *Journal of geophysical research,* Mar. 1, 1984 89(A3), p.1602-1612, 29 refs.

Data from search coil magnetometer, riometer, and photometer instrumentation at Siple, Antarctica, are compared with vector magnetometer data from south polar passes of the MAGSAT satellite for three magnetically disturbed days in early 1980. Two kinds of association were found between irregular pulsation activity in the 0.5- to 40-s frequency band (Pi 1) observed on the ground and magnetospheric-ionospheric currents measured from space. These associations are described. These observations support models suggesting that Pi 1 pulsations represent fluctuations of a three-dimensional current system in the magnetosphere and are consistent with recent conductivity and current enhancement models for the ionospheric source of Pi 1 activity. (Auth. mod.)

K-30574

Cazeneuve, H., Tabocchini, H., Piran, M., **Spectral behaviour of disturbances observed in the southern auroral zone,** *Annales de géophysique,* 1982 38(6), p.771-779, With French summary. 12 refs.

Geomagnetic substorms and the associated ionospheric absorption processes are analyzed. Cross-correlation and spectral analysis techniques are applied, in order to unravel the diverse information contained in the original data. Correlation level contours follow systematic variations in the course of each event, which indicates that the coupling between the involved regions is subject to complex and regular variations. The dynamic behavior of the spectral parameters is analyzed. The spectral power and the spectral slopes are found to exhibit recurrent variations that are indicative of a continuous power redistribution. Such ordered variations suggest a continually variable gradient of power, whose effects are felt at Belgrano as the station faces successive disturbance sectors during its daily rotation. (Auth.)

K-30575

Kane, R.P., **Particle precipitation in the ionospheric F2 region at locations in the vicinity of the South-Atlantic magnetic anomaly,** *Annales de géophysique,* 1982 38(6), p.841-848, With French summary. 22 refs.

The f0F2 daily variation characteristics were compared for IGY equinox months for pairs of stations at roughly similar dip angles, geomagnetic latitudes and L-shell values. It was found that locations on the west coast of South-Africa showed larger f0F2 in the afternoon hours as compared to locations on the east coast of South-America and in the Antarctic. It is suggested that at least a part of this excess may be due to particle precipitation effects in the South-African mid-latitude region. The particles could be either ions or secondary electrons. In low latitudes, Buenos Aires showed larger afternoon f0F2, indicating its probable vicinity to the anomaly region. (Auth.)

K-30576

Smirnova, N.A., **Diagnostic possibilities of surface VLF chorus** [O diagnosticheskikh vozmozhnostiakh nazemnykh ONCh-khorov], *Magnitosfernye issledovaniia,* 1984 No.4, p.59-65, In Russian with English summary. 10 refs.

On the basis of spectral characteristics of VLF chorus recorded on the Earth surface, the L-shell of the region of their generation in the magnetosphere is found and the parameters of plasma near the source (large-scale electric fields, the density of cold plasma, some characteristic of energetic electrons) are estimated. The calculated and experimental parameters are shown to be in good agreement. (Auth.)

K-30632

Troitskaia, V.A., **Studies on the complex of electromagnetic phenomena in the Antarctic,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.28-48, TT 79-52012, For Russian original see 10K-21688. 2 refs.

After an introduction reviewing current concepts of magnetospheric structure and dynamics, basic findings of investigations into various disciplines relating to the geomagnetic field and ground currents, aurora, ionospheric radio propagation, and cosmic rays are briefly outlined. New physical phenomena have been discovered in studying this complex of subjects. Special emphasis is laid on the asymmetry in electromagnetic flow processes in the Arctic and Antarctic. Approaches for using available knowledge to study the lower atmosphere and to predict magnetospheric disturbances and radio propagation are suggested. To conclude, the author offers proposals for further research into electromagnetic disciplines. (Auth. mod.)

K-30633

Men'shutina, I.N., **Possibility of classification of photometric records at the polar cap,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.49-54, TT 79-52012, For Russian original see 10K-21689. 12 refs.

Long-period auroral variations were studied from photometric data gathered at Mirnyy. There are at least three types with periods of more than 2 minutes. Different UT (LT) variations, depending on the AE-index, are identified. (Auth. mod.)

K-30634

Men'shutina, I.N., **Behavior of plasma sheet during breakup according to Mirnyy Station data,** Antarctic Committee report, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.55-59, TT 79-52012, For Russian original see 10K-21690. 15 refs.

Low frequency geomagnetic field pulsations, recorded at high-latitude stations, are proposed as a kind of "instrument" for the study of changes in the thickness of the plasma layer. It is hypothesized that the moment of changeover from thinning to thickening of the layer can be equated with the minimal pulsation period. Data recorded at Mirnyy and Dickson Stations were used to calculate the time lapse between the development of breakup at the zonal station and initiation of plasma layer thickening at $L = 19$. It may be possible to diagnose the plasma layer with low-frequency pulsations, and a series of problems possibly amenable to solution in this way are proposed. (Auth. mod.)

K-30636

Zaïtseva, N.A., Shliakhov, V.I., **Results of multi-year research on long-wave radiation in the antarctic atmosphere,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.90-98, TT 79-52012, For Russian original see 10K-29692. 6 refs.

The radiation regime in polar regions has unique characteristics. During the polar night there is no solar radiation and around the clock only low-frequency atmospheric radiation is present. Actinometric soundings were carried out by airplane around Mirnyy from 1958 to 1962 and by radiosonde at Molodezhnaya (1966-1968) and Bellingshausen (1969-1972). Data on vertical distribution of incoming and outgoing radiational heat for the different seasons and under various atmospheric conditions are analyzed. Radiation profile characteristics are determined primarily by the low temperature of the underlying surface and by the extreme clarity of the atmosphere. Radiation patterns differ greatly between the coastal and continental stations, and this is reflected in free atmosphere temperatures at coastal stations. (Auth. mod.)

K-30638

Gusev, A.M., **Peculiarities of circulation of the antarctic atmosphere and waters of the southern ocean,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.117-136, TT 79-52012, For Russian original see 10K-21694. 16 refs.

The results of studies of the heat regime and dynamics of the antarctic atmosphere and southern ocean waters are discussed. General circulation charts are constructed, and the physical factors determining air and water circulation patterns, cyclones and eddies are outlined. There are two possible explanations for the formation of cyclonic patterns: wave action or convection. A smoothed mathematical model of large-scale horizontal convection due to global rotation is proposed. The number of eddies in a basin is determined by modelling atmospheric and marine conditions around the Antarctic, and the theoretical locations agree well with field observations. Such models must be constructed first for polar areas, since there the symmetry of processes in relation to geographic coordinates simplifies the issue. Thus Antarctica can serve as a natural model for analogous but more complex situations in the northern hemisphere. (Auth. mod.)

K-30653

Mansurov, S.M., Mansurova, L.G., Okulova, L.S., **Catalog of determinations of the sector polarity of the interplanetary magnetic field, 1975-1976,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.345-348, TT 79-52012, For Russian original see 10K-21709. 7 refs.

Determinations of predominant polarity of the interplanetary magnetic field sectors from 1975 to 1976, recorded daily and categorized by the type of geomagnetic field variations at polar stations, are summarized in charts. A brief description of the sector structure of the IMF is included. (Auth. mod.)

K-30664

Kunitake, M., Oguti, T., **Spatial-temporal characteristics of flickering spots in flickering auroras,** *Journal of geomagnetism and geoelectricity,* 1984 36(4), p.121-138, 21 refs.

Using video data obtained by a low-light-level TV camera, spatial-temporal characteristics of flickering spots in flickering auroras are studied. The results show that flickering spots often move in periodic fashion synchronized with their luminosity oscillations. For the ex-

mples studied here, the frequency ranges from 3 to 8 Hz; the velocity
f the motion of spots perpendicular to the magnetic field is in a range
om 90 to 240 km/s and the horizontal distance of the motion is in
range 10 to 20 km, being almost equal to the size of a spot. It is
nown that many spots often form a cluster and that many clusters are
istributed along an auroral arc. It is also shown that the lifetime of
certain flickering spot is 1 to 2 seconds and that the lifetime of the
uster is tens of seconds to hundreds of seconds. (Auth.)

-30709

oco, D.S., Clynch, J.R., **Measurement of ionospheric
lectron columnar content changes over McMurdo
tation,** *Antarctic journal of the United States,* 1983 18(5),
257.

Applied Research Laboratories, The University of Texas at Aus-
n has operated a satellite tracking station at McMurdo, Antarctica
nce 1968 to provide geodetic positioning data for federal agencies.
nce 1979 the station has also collected differential Doppler data in
form which provides detailed information about the ionospheric
regularities along the line of sight between the station and satellite.

-30721

udeney, J.R., **Accuracy of simple methods for
etermining the height of the maximum electron
oncentration of the *F2*-layer from scaled ionospheric
naracteristics,** *Journal of atmospheric and terrestrial
iysics,* 1983 45(8-9), p.629-640, 14 refs.

The techniques for estimating *hmF* from *M* (3000)F2 are re-
ewed with particular stress put upon those in which the effects of
derlying ionization are accounted for by a correction. The simpli-
ing assumptions involved in three practical implementations (Brad-
y and Dudeney, 1973; Dudeney, 1974; Bilitza *et al.,* 1979) are
nphasised and their consequences investigated quantitatively using
numerical simulation. The factors considered are the dependence
on *ymF*2, the importance of the underlying layer shape, and the
fluence of the geomagnetic field. It is demonstrated that the cor-
ction technique relies upon *ymF* being a direct polynomial function
*hmF*2. Analysis of observational data suggests that this relation-
ip holds in practice. Fluctuations in *ymF*2 about this mean
riation are shown to produce only small effects which decrease in
agnitude as the amount of underlying ionization increases. It is
monstrated that exclusion of the geomagnetic field introduces a
ry small extra uncertainty dependent upon gyrofrequency and
omagnetic latitude, which decreases as the amount of underlying
iization increases. The three implementations are compared and
s concluded that the Dudeney (1974) scheme gives the best overall
rformance. (Auth.)

30722

odger, A.S., **Spread-*F* ionospheric irregularities and their
lationship to stable auroral red arcs at magnetic mid-
titudes,** *Journal of atmospheric and terrestrial physics,*
84 46(4), p.335-342, 28 refs.

The signature of the stable auroral red arc (SAR arc) as it appears
ionograms is described. The key features are a very significant in-
ase in the amount of spread-*F* and a reduction in the maximum
sma density compared with regions just equatorward and poleward
the SAR arc. Identification of the SAR arc signature is made by
ng complementary data from the global auroral imaging instrument
board the Dynamics Explorer-1 satellite. At sunspot minimum
re is a positive correlation between the occurrence of spread-*F* on
ograms from Argentine Islands, and magnetic activity. In con-
st, at sunspot maximum there is a weak negative correlation when
K magnetic index is less than 6, but a significant increase in spread-
ccurrence at K less than, and equal to 6. Detailed study of iono-
ms shows that there are two distinct regions where considerable
ead-*F* is observed. These are the region where SAR arcs occur and the poleward edge of the mid-latitude ionospheric trough. They are separated by a region associated with the trough minimum, where comparatively little spread-*F* is seen. It is suggested that the movement of these features to lower latitudes with increasing magnetic and solar activity can explain the lack of correspondence between variations of spread-*F* occurrence as a function of magnetic activity at sunspot maximum compared with that at sunspot minimum at Argentine Islands. (Auth.)

K-30723

Jones, D., Lefeuvre, F., Parrot, M., **Characteristics of VLF emissions manifested by their cross-spectral phase information,** *Planetary and space science,* 1983 31(10), p.1083-1097, 11 refs.

Natural VLF emissions received by a single antenna can be characterized at each point in the emissions' frequency-time domain by a power and a phase. Emissions received at a single point by two antennae with a fixed relative orientation in space can be similarly described by the cross-spectral power and relative phase. It is shown that the cross-spectral phase contains information on the propagation characteristics of the waves which is better utilized in wave analysis than the power. In fact, the phase information allows weak signals to be identified more readily than is possible from a power spectrogram. It also allows the recognition of waves propagating with different wave normal directions. Data from the *Geos*-1 electric and magnetic antennae, pre-processed by the on-board correlator, are used to study the cross-spectral characteristics of VLF hiss and chorus in the Earth's magnetosphere. (Auth.)

K-30740

Lauter, E.A., Bremer, J., Grafe, A., Rössler, H., Schäning, B., **Regular and extreme variations of high latitude ionospheric plasmas in the mesosphere and lower thermosphere** [Reguläre und exzessive Variationen des ionosphärischen Plasmas in der Mesosphäre und unteren Thermosphäre hoher Breiten], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 No.10, p.1-139, In German with English and Russian summaries. Refs. p.99-101.

The paper describes the essential scientific results derived from extensive ionospheric observations made by three German teams during their participation in the 21st, 22nd and 23rd Soviet Antarctic Expedition at the Soviet station Novolazarevskaya. The general aim of this complex antarctic programme was an investigation of precipitating high energy particles (HEP) into the lower ionosphere and their influence on the neutral gas of the mesosphere. Ionospheric absorption measurements at different frequencies, aurora observations with a scanning spectrophotometer, and geomagnetic measurements, mainly carried out between June 1976 and November 1978, together with data from other stations, form the basis for the results obtained. Specific aspects of the investigation are reported. A general description of the geophysical situation at Novolazarevskaya as well as the measuring period and the data used are given. The daily variation of the HEP precipitation is derived for subauroral latitudes. On the basis of detailed discussions of many individual substorm events the connection between auroral emissions at different frequencies, auroral electrojet and ionospheric absorption is analyzed. The influence of the solar wind and interplanetary magnetic field (IMF) on the particle precipitation into the atmosphere is discussed. The connection between ionospheric data of different stations in both hemispheres and geomagnetic data is demonstrated by extensive correlation studies. In annexes, methodical problems of ionospheric absorption measurements in high latitudes and of observations of auroras with a spectrophotometer are discussed in detail. (Auth. mod.)

K-30758

Bremer, J., Lauter, E.A., Rössler, H., Schäning, B., **Comparison of upper atmosphere particle effects at different latitudes in both hemispheres** [Vergleich hochatmosphärischer Partikeleffekte in verschiedenen Breiten auf beiden Hemisphären], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.31-37, In German with English and Russian summaries. 9 refs.

On the basis of absorption measurements from 1976 to 1978 at Novolazarevskaya the influence of precipitating high energy particles was investigated on the ionospheric plasma of the meso- and lower thermosphere in subauroral latitudes. It could be shown that the winter anomaly well-known from absorption measurements in middle latitudes also exists in subauroral south latitudes. However, the ionization maxima during equinoxes dominate because of the favorable conditions for the precipitation of high energy particles during these times. By means of absorption measurements in Novolazarevskaya and data from other stations the global character of post storm events (PSE) after strong geomagnetic disturbances could be confirmed. These events, caused by precipitating high energy electrons, last some 15 days and influence the two belts in both hemispheres between the auroral zone and about 40-50 deg geomagnetic latitude depending on the magnitude of the disturbance. Therefore, PSE are the most important direct extraterrestrial influence of long duration upon the atmosphere below 100 km heights so far known. (Auth.)

K-30759

Grafe, A., **Evening to morning asymmetries of electron precipitation at auroral latitudes** [Abend-Morgen-Asymmetrieeffekt der Elektronenpräzipitation in auroralen Breiten], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.38-48, In German with English and Russian summaries.

Using observations of the geomagnetic variation field, of ionospheric absorption and of aurorae obtained at Novolazarevskaya during magnetospheric substorms, conclusions are drawn as to differences in electron precipitation in the morning and in the evening sectors. It is shown that the higher energetic electron component (E >100 keV) is often missing in the evening sector whereas it can always be observed in the midnight and morning sector during a substorm. The observed electron spectrum in the morning sector is characterized by significant temporal variations. (Auth.)

K-30804

Gernandt, H., Schäning, B., **Studies of the upper layers of the polar atmosphere,** *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1984 Special issue, p.19-24, With German and Russian summaries.

Development of upper atmospheric studies through the use of satellites is recounted. Basic properties and processes of protons and electrons in the magnetosphere are given. The research program implemented resulted in important discoveries about plasma, natural gas, and solar wind which will be useful in future programs. Photos of research stations and equipment are included.

K-30882

Gernandt, H., **Ionospheric observations of a GDR group during the 21st Soviet Antarctic Expedition 1975-1977** [Ionosphärische Beobachtungen der DDR-Gruppe während der 21. Sowjetischen Antarktisexpedition 1975 bis 1977], *Geodätische und geophysikalische Veröffentlichungen, Reihe II,* 1979 No.22, p.1-56, In German. 30 refs.

An ionospheric research program is described along with the handling of the data and the usefulness of the observational program and its goals. Absorption measuring methods are compared and ionospheric conditions over Novolazarevskaya and the effects of reflectivity are discussed. Analyses are made of annual and daily absorption patterns and circulation systems; aurora influence and particle precipitation were measured and are discussed. The wintering party at Novolazarevskaya utilized ozonosonde and satellite data, described the varying states of the ice sheet, and took underwater photographs of vegetation in lakes of the Schirmacher region. Results of these observations are summarized.

K-30934

Holzworth, R.H., Meng, C.-I., **Auroral boundary variations and the interplanetary magnetic field,** *Planetary and space science,* Jan. 1984 32(1), p.25-29, 13 refs.

This paper describes a DMSP data set of 150 auroral images during magnetically quiet times which have been analyzed in corrected geomagnetic local time and latitudinal coordinates and fit to offset circles. The fit parameters have been compared to the hourly interplanetary magnetic field prior to the time of the satellite scan of the aurora. The results for variations agree with previous works. The location of the circle center also has a clear statistical shift in the Southern Hemisphere. (Auth. mod.)

K-30935

Candidi, M., Meng, C.-I., **Nearly simultaneous observations of the conjugate polar cusp regions,** *Planetary and space science,* Jan. 1984 32(1), p.41-46, 16 refs.

The first simultaneous observations of the low altitude polar cusp regions in the conjugate hemispheres are reported based on two events detected by the *DMSP-F* 2 and *F* 4 satellites within the same geomagnetic local time sector. It is found that the electron spectra in the cusp are identical in the opposing hemispheres. In one case the observed latitudinal location and extent of of the cusps are the same at the two hemispheres. However, in the other case the location of the equatorward boundary of the cusp regions differs by about 2 deg with drastically different spatial features. It is also found that in one of the events the plasma sheet electron precipitation regions overlap with the cusp regions at lower latitude in both hemispheres. The poleward boundary of these overlapping regions is located at the same latitude on either hemisphere suggesting that this is the latitude of the last closed field line and that the cusp electrons are present on both closed and open magnetic field lines. (Auth.)

K-30945

McKibben, B.N., **Atmospheric infrasound from volcanic eruptions in 1982,** *Antarctic journal of the United States,* 1983 18(5), p.257-259, 3 refs.

Observations of atmospheric infrasonic waves have been made at Windless Bight near McMurdo Station since 1976. Through the 1982 austral winter season, computer software was developed to facilitate the retrieval and analysis of the data collected. This software package includes time-domain analysis, spectral analysis, frequency-wavenumber (f-k) analysis, pure-state filtering, beam-steer vector filtering, and rudimentary graphics. A method was also developed for transmitting analysis results and diagrams to Fairbanks, Alaska. Infrasonic waves produced by four explosive eruptions of El Chichonal Volcano in Mexico and one eruption of Galunggung in Java were observed at Windless Bight in 1982. Time domain analysis results are given for signals from all of the eruptions recorded traveling in the direct great circle path from the source to Windless Bight and for signals from two of the eruptions traveling in the antipodal path. The data include event time, travel time, velocity, azimuth of arrival and energy release estimates.

K-30946

Detrick, D.L., Rosenberg, T.J., Lanzerotti, L.J., MacLennan, C.G., **Riometry in Antarctica,** *Antarctic journal of the United States,* 1983 18(5), p.259-260, 3 refs.

As part of the expanding facilities for upper atmospheric physics research at South Pole and McMurdo Stations, the University of Maryland installed a digital data acquisition system at both stations during the 1981-1982 austral summer season. In the 1982-1983 summer season, an identical system was installed at Siple Station, and a 30 MHz riometer was placed at Palmer Station. The data acquisition systems now operating at all stations (except Palmer) are designed to digitize and record analog signals at any one of three fixed sampling rates: 10, 1, or 0.1 Hz. The University of Maryland riometers (Siple: 30 MHz; McMurdo: 30 and 51.4 MHz; South Pole: 20.5, 30, and 51.4 MHz) are sampled at the 1-Hz rate. In addition, at Siple and South Pole Stations, magnetic (1 Hz; 10 Hz), very-low-frequency emission (1 Hz), and auroral intensity (1 Hz) variations are recorded at the indicated sampling rates. Data from a pre-midnight absorption event at South Pole Station and a band-pass filtered 30 MHz riometer signal at McMurdo Station are examined to demonstrate the importance of simultaneous digital recording of complementary signals.

K-30947

Pomerantz, M.A., **Cosmic ray intensity variations,** *Antarctic journal of the United States,* 1983 18(5), p.261-262, 1 ref.

Investigations of a ground-level enhancement (GLE) solar flare event occurring on Dec. 7, 1982 and observed at three Bartol antarctic stations have yielded some puzzling characteristics. Further, the first of a series of investigations using an underground cosmic ray detection system at Mawson Station has also yielded an unexpected result. A comparison of the data recorded during a long highly disturbed period from June to November 1982 revealed significant differences in the intensity vs. time profiles of the McMurdo Station neutron monitor (mean rigidity of response about 9 GV) and a new underground telescope at Mawson (mean rigidity of response about 180 GV). Preliminary analysis, which also involves observations by a multi-directional surface telescope at Nagoya, Japan has led to the conclusion that the effect is produced by the superposition of a north-south anisotropy and a worldwide Forbush decrease.

K-30948

Harris, S.E., Mende, S.B., **Antarctic automatic geophysical observatories,** *Antarctic journal of the United States,* 1983 18(5), p.262-264.

The Lockheed Palo Alto Research Laboratory has built a prototype Automatic Geophysical Observatory (AGO) for use in Antarctica. These AGO's are multi-user facilities, providing power and data storage for a complement of ground-based instruments and will allow extensive space-time monitoring of the Earth's geophysical environment. The development of the AGO is aimed specifically toward satisfying the need for an unmanned observatory chain in the high latitude regions of Antarctica. The system is illustrated and described. Tests at South Pole Station show the average power consumption of the AGO data system and system sensors to be only 18 watts.

K-30949

Arnoldy, R.L., Cahill, L.J., Jr., **Magnetic pulsation activity at South Pole Station,** *Antarctic journal of the United States,* 1983 18(5), p.265-266, 3 refs.

The year 1982 was the first year of continuous digital recording of geomagnetic pulsations at the South Pole from the University of New Hampshire/University of Minnesota induction antennas. A first attempt was made to characterize the pulsation activity at the South Pole by defining an activity index. This index is the averaged amplitude of the high-pass filtered data from the x-axis antenna. The filter edge is set a 0.1 hertz, hence the index includes Pi 1, Pc 1, and Pc 2 pulsations. Hours in which the activity index exceeded 0.2 were recorded for the first 147 days of 1982. Plots of the data are shown and briefly discussed. The geophysical significance of the data must await more detailed analysis and correlation with other south polar measurements.

K-30950

Pomerantz, M.A., **Solar seismology at the South Pole: Studies of solar oscillations,** *Antarctic journal of the United States,* 1983 18(5), p.266-267, 1 ref.

Work is continuing on extracting new information from the unique data set acquired during the first campaign of the full-disk Doppler-shift experiment conducted during the 1979-80 austral summer in collaboration with French researchers. During the past year, a new concept for conducting solar observations at the South Pole was designed, developed, and successfully tested in the field. The original vertical telescope has been replaced by a superior and simpler system which has eliminated all of the problems inherent in the original arrangement. A drastically improved full-disk experimental package constructed by the French developed problems requiring that the system be redesigned. Experiments with a wind-fence designed to reduce the wind speed at the instrument yielded dramatic results.

K-30951

Stebbins, R., Mann, R., **Observations of solar oscillations at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.268-269, 2 refs.

The internal properties of the Sun can be deduced from the star's acoustic normal mode spectrum. A telescope designed to measure brightness oscillations of the Sun was operated at the Amundsen-Scott South Pole Station throughout the austral summer of 1982-1983. The equipment performed very well, and an unusually large amount of data was obtained. Over 600 hours of data were acquired, the longest unbroken set being 115 hours. The data reduction procedure, which is in progress, and subsequent analysis are summarized.

K-30952

Carlson, C.R., **Siple 21- and 42-kilometer antennas: Measurement and performance,** *Antarctic journal of the United States,* 1983 18(5), p.270-272, 4 refs.

This paper gives the performance of the 21-kilometer-long and 42-kilometer-long very-low-frequency (VLF) dipole antennas in operation at Siple Station, Antarctica. Extension of the existing 21-kilometer center-fed dipole antenna to 42-kilometer was completed during the 1982-1983 austral summer. The measurement procedure and antenna construction are illustrated; the current in the 42-kilometer antenna and the voltage between the antenna and the support tower are plotted for the frequency, 7.75 kilohertz; the electrical properties of the antennas are tabulated at the various resonant frequencies.

K-30953

Bell, T.F., Katsufrakis, J.P., James, H.G., **Studies of the spectral broadening effect with the Siple Station VLF transmitter,** *Antarctic journal of the United States,* 1983 18(5), p.272-274, 6 refs.

In the past, data acquired on both high- and low-altitude satellites have indicated that most important VLF wave-particle interactions took place at high altitudes close to the magnetic equatorial plane. However, recent low-altitude VLF wave-injection experiments involving the Siple Station VLF transmitter, the Omega navigational transmitter in North Dakota, and the three satellites ISIS-I (Canada), ISIS-II (Canada), and ISEE-1 (United States) have demonstrated the existence of a new phenomenon in which initially narrowband (approximately 1 hertz) signals from ground-based VLF transmitters undergo a significant frequency bandwidth increase as they propagate through regions where energetic electron precipitation is thought to take place. Examples of the spectral broadening effect as observed on the ISIS-I and -II satellites are shown and described. It is demonstrated that upward and downward propagating signals can exhibit spectral broadening at the same time.

K-30954

Brittain, R., Kintner, P.M., **Observations of standing waves in VLF hiss over Siple Station,** *Antarctic journal of the United States,* 1983 18(5), p.275-277, 4 refs.

Very low frequency (VLF) electric and magnetic field experiments were flown on sounding rockets Nike-Tomahawk 18.203-205 from Siple Station during December 1980-January 1981. Observations were made of systematic patterns in naturally occurring VLF hiss, which were not observed simultaneously on the ground at Siple. These patterns have been interpreted as standing waves formed by interference between downcoming waves and waves reflected from a sharp layer in the ionosphere at about 90 km. Deductions are drawn concerning the refractive index of the medium for such waves and these are supported by independent measurements.

K-30955

Helliwell, R.A., **Siple Station VLF two-frequency squelch experiments,** *Antarctic journal of the United States,* 1983 18(5), p.277-278, 7 refs.

A new transmitter with AM and FM capability was placed in operation at Siple Station in 1979 to replace the smaller, less flexible Zeus transmitter. The purpose of this article is to describe a new Jupiter experiment in which two equal-amplitude signals at frequencies f1 and f2 were observed to squelch one another when f2-f1 equals approximately 20 hertz. These new experiments extend earlier results obtained using the limited FM capability of the Zeus transmitter. Examples of the transmitted and received signal spectra are shown along with the average amplitude of the received signal.

K-30956

Cahill, L.J., Jr., Sugiura, M., Arnoldy, R.L., Engebretson, M.E., **Conjugate magnetic pulsation studies at Siple, Roberval, and DE-1,** *Antarctic journal of the United States,* 1983 18(5), p.279-281, 4 refs.

A magnetic pulsation event occurring on July 14, 1982 at a time when the Dynamics Explorer-1 (DE-1) satellite was in approximate magnetic conjugacy with Siple Station and Roberval, Quebec is illustrated and described. The observations at the three sites support the idea of the waves as a resonant oscillation of magnetic field lines. The relatively weaker amplitude at Siple may be due to low conductivity in the dark winter ionosphere at Siple in July. Oscillating ionospheric E region currents, set in motion by the field line resonance, are thought to be responsible for the pulsations observed on the ground. The sunlit ionosphere at Roberval should have sufficient conductivity to allow substantial oscillating currents while the low conductivity at Siple decreased the current amplitude and thus the ground pulsations.

K-30957

Armstrong, W.C., **Recent advances from studies of the Trimpi effect,** *Antarctic journal of the United States,* 1983 18(5), p.281-283, 15 refs.

Progress made since 1963 with a method designed to study the possible effect of vertical transport of charge upward into the ionosphere above a thundercloud is reviewed. The technique consists of continuous monitoring of radio signals propagating in the Earth-ionosphere waveguide and reproduction of the signals for laboratory study, using a system which is optimized to reject noise to the extent necessary to pass the particular ionospheric transients being sought. Results based on data recorded on Oct. 25, 1980, during a period of severe storm conditions indicate the possibility of significant amounts of transferred charge and show accompanying whistlers and sferics with unusually strong ELF components. A sample recording (Annapolis, MD-Siple Station, Antarctica) which seems to imply a direct effect of lightning on the ionosphere, is presented.

K-30958

Gail, W.B., **Suppression of natural VLF noise by whistlers,** *Antarctic journal of the United States,* 1983 18(5), p.283-285, 3 refs.

A recent analysis of data from South Pole, Palmer and Byrd Stations as well as Siple has revealed that noise suppression by whistlers is far more common than previously suspected. Data acquired at South Pole during 1981 showed suppression events on 20% of all winter days; similar events have now been identified on 5% of all days at Siple during 1977, 1978, and 1980. The evidence indicates that whistlers interact with the particles that are believed to produce natural VLF noise. Events observed at Siple on July 24, 1977 not only provide support for the wave/particle interaction model, but also suggest that suppression may be a driving mechanism for particle loss from the magnetosphere. It is possible that suppression events are a natural analog to the quiet-band effect, in which portions of noise bands were found to be attenuated by Siple transmitter signals.

K-30959

Carpenter, D.L., Katsufrakis, J.P., Trimpi, M.L., Dermedziew, M., **Whistler-induced perturbations of broadcast band signals,** *Antarctic journal of the United States,* 1983 18(5), p.285-286, 3 refs.

The occurrence of a Trimpi event typically appears to a field observer as a fast change in the level of a signal at the time of reception of a lightning-induced whistler. Recent research based on observations at Palmer and Siple Stations has provided evidence that the size of the subionospheric change is proportional to the amplitude of the correlated whistler. A current observational program at Siple and Palmer is devoted to study of Trimpi effects at frequencies in the low- and medium-frequency bands from approx 30 kHz to approx 1 MHz. Of particular interest is the fact that well-defined perturbations have also been seen on 780 and 800-kHz signals originating in South America. Two examples are presented: 1) perturbations recorded at Palmer on subionospheric signals ranging in frequency from 12.9 kHz to 780 kHz, and 2) Palmer Station records showing a correlation between whistlers and several strong perturbations in a 780-kHz signal.

K-31057

Ranta, H., Ranta, A., Rosenberg, T.J., **Day to night absorption ratio in auroral and subauroral zone riometer measurements during auroral absorption,** *Journal of atmospheric and terrestrial physics,* May 1984 46(5), p.395-398, 9 refs.

The day to night ratio of auroral absorption has been studied using data from auroral and subauroral latitudes and by application of different kinds of statistical analyses. Ratios between 0.5 and 3.0 are obtained, depending on the criteria applied to the selection of data. Previous studies obtained similar ratios, but reached different conclusions about the effective solar control of auroral absorption. It is concluded that evidence of solar control of the day to night ratio of auroral absorption, or the lack thereof, cannot be extracted by these statistical analyses. (Auth.)

K-31072

Crowley, G., Dudeney, J.R., Rodger, A.S., Jones, T.B., **Large simultaneous disturbances (LSDs) in the antarctic ionosphere,** *Journal of atmospheric and terrestrial physics,* Oct 1984 46(10), p.917-925, 42 refs.

A high frequency radio Doppler experiment was deployed in the Antarctic Peninsula region, centered on Argentine Islands to investigate the morphology and sources of ionospheric disturbances. The experiment consisted of a three-transmitter dual frequency network which permits horizontal and vertical propagation velocities to be estimated over a north-south baseline of 200 km and an east-west baseline of 100 km. A new class of ionospheric disturbance has been observed, in the period range 10 min-1 h. These disturbances are characterized by unusually good correlation between perturbations on all available Doppler signals, but are apparently non-propagating and occur simultaneously at each reflection point. Criteria for identification of LSDs are established and the analysis of one event is described in detail. The occurrence statistics of the LSDs are presented, including their seasonal and diurnal distributions. There is no clear general relationship between LSDs and local geomagnetic field perturbations. However, there is a loose association between the occurrence and amplitude of LSDs and magnetic activity. (Auth. mod.)

K-31073

Rash, J.P.S., Gledhill, J.A., **Electron density profiles over the southern ocean from oblique incidence ionograms,** *Journal of atmospheric and terrestrial physics,* Oct. 1984 46(10), p.945-951, 15 refs.

This paper presents a first attempt to use oblique incidence ionograms over the 4500 km path from SANAE to Grahamstown, South Africa, to deduce information about the ionosphere in the intervening regions. It is shown that existing methods for the reduction of oblique incidence ionograms to *N(h)* profiles give reasonable results even over the two-hop path involved. By comparison with vertical incidence ionograms made from a research ship below the reflection regions it is shown that the maximum observed frequency is normally limited by conditions at the southernmost reflection point, though this may be modified by ionospheric tilts, sunrise and sunset. (Auth.)

K-31263

Hughes, W.J., Singer, H.J., **Mid-latitude Pi 2 pulsations, geosynchronous substorm onset signatures and auroral zone currents on March 22, 1979: CDAW 6,** *Journal of geophysical research,* Feb. 1, 1985 90(A2), p.1297-1304, 16 refs.

The mid-latitude Pi 2 pulsation signatures observed using the Air Force Geophysics Laboratory Magnetometer Network during the March 22, 1979, Sixth Coordinated Data Analysis Workshop interval are related to the magnetic variations observed at geosynchronous orbit and to ionospheric current distributions derived from high latitude (Halley) magnetometer data and an ionospheric conductivity model. It is shown that at least three separate substorm onsets or intensifications occurred around 1100 UT, specifically at 1053:50, 1104:10 and 1110:30 UT. An earlier onset which occurred at 0614 UT during a geomagnetically quiet interval is contrasted to these more disturbed events. In both cases the Pi 2 polarization pattern locates the region of strong westward electrojet. Changes in the Pi 2 polarization during a single event appear to accompany small shifts in the electrojet position. These events do not obey the Pi 2 period-electrojet latitude relationship obtained by Kuwashima and Saito (1981). (Auth.)

K-31264

Carlson, C.R., Helliwell, R.A., Carpenter, D.L., **Variable frequency VLF signals in the magnetosphere: associated phenomena and plasma diagnostics,** *Journal of geophysical research,* Feb. 1, 1985 90(A2), p.1507-1521, Refs. p.1520-1521.

Coherent variable frequency signals (ramps) extending from 1 to 8 kHz, injected into the magnetosphere from Siple Station, Antarctica exhibit upper and lower cutoffs when received at the conjugate station, Roberval, Quebec. Ramp group delay measurements and ionospheric sounding data are used for the first time to determine the cold plasma density and L shell of the propagation path. Observed upper cutoff characteristics are interpreted in terms of off-equatorial gyroresonant interaction regions and ducted propagation limited to frequencies below half the local gyrofrequency. The observed lower cutoff frequencies varied systematically with transmitted ramp slope, suggesting a threshold in the resonant electron number density above which rapid temporal wave growth and saturation can occur. This concept is used to develop a hot plasma diagnostic technique which provides an estimate of the energy dependence *n.* A test of this technique is given using the data and a simplified wave-particle interaction simulation. Additional aspects of the magnetospheric response to ramp injection, including emission triggering, are discussed.

K-31265

Eather, R.H., **Polar cusp dynamics,** *Journal of geophysical research,* Feb. 1, 1985 90(A2), p.1569-1576, 14 refs.

The position of dayside aurora (as measured from South Pole Station in 1980) is compared with the interplanetary magnetic field Bz component and to the AE index. The results are consistent with earlier work showing a close relationship with AE and little correlation with Bz. Two recent papers have presented data that were interpreted to indicate a dominant Bz correlation. A reconsideration of the data sets used in those papers does not support dominant Bz dependence, and in fact reaffirms a close dependence on AE. It is concluded that the position of the dayside cusp is largely controlled by substorm processes internal to the magnetosphere rather than by direct merging and erosion processes with the interplanetary field. (Auth.)

K-31266

Reiff, P.H., Burch, J.L., **IMF By-dependent plasma flow and Birkeland currents in the dayside magnetosphere. 2. A global model for northward and southward IMF,** *Journal of geophysical research,* Feb. 1, 1985 90(A2), p.1595-1609, Refs. p.1608-1609.

A model is presented which encompasses several features of the theta arc phenomenon, and makes several predictions with respect to symmetries and antisymmetries between the two polar caps.

K-31286

Japanese Antarctic Research Expedition, **Records of all-sky camera photographs at Syowa Station, Antarctica in 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Nov. 1984 No.97, 80p.

The station location is defined; cameras and method of operation are described. The log of operation is shown both in graphs and tables by date and universal time. K-index data are presented. Photographs of nine events are shown in an appendix.

K-31326

Auster, V., Kopsch, C., **Fascinating aurora in Antarctica** [Faszination Polarlicht in der Antarktis], *Spectrum,* 1984 35(9), p.15-17, In German.

A brief description is given of the magnetic measurement facility and equipment at Novolazarevskaya Station in the Schirmacher area. Ongoing programs are mentioned and photographs of the station and auroras are included.

K-31385

Hajkowicz, L.A., **Onset time interval of geomagnetic disturbances in the conjugate areas,** *Planetary and space science,* July 1984 32(7), p.819-823, 20 refs.

The onset time interval of geomagnetic disturbances, as deduced from the numerous cases of rapid changes of K-indices over a cycle in solar activity, was studied for two conjugate and auroral stations, Macquarie Island and College. There is a distinct peak in the occurrence number of the disturbances for both stations at an interval 09.00-12.00 U.T., which is close to the local midnight at College but is in the pre-midnight sector at Macquarie Island. For comparison, a similar study was applied to the magnetic data obtained at two more auroral stations, Kiruna and Sodankyla. The onset time of the disturbances for these stations was most frequent at 18.00-21.00 U.T., centered at the conjugate midnight of Kiruna and Sodankyla in the Southern Hemisphere but well ahead of the local midnight of the stations themselves. The specific diurnal occurrences of the disturbances at all four auroral stations are consistent with a difference in the geometry between the southern and northern auroral ovals. It appears that the prevailing onset time of geomagnetic disturbances is associated with the time when both conjugate stations (or conjugate locations) are within the auroral oval and thus accessible to a direct particle influx from the Earth's magnetotail. (Auth.)

K-31386
Morris, R.J., Cole, K.D., **Pc1-2 discrete regular daytime pulsation bursts at high latitudes,** *Planetary and space science,* Jan. 1985 33(1), p.53-67, 22 refs.

A family of related Pc1-2 (0.2-10 s) discrete daytime geomagnetic pulsations is presented using pulsation data obtained at Davis, Antarctica, a typical polar-cap station. The morphological properties of IPRP and Pc1b pulsation regimes, which maximize in amplitude and frequency of occurrence under the projection of the polar cusp, are examined. Furthermore, two other variations of discrete pulsation bursts yet to be named are also presented, viz IPFP (Intervals of Pulsations with Falling Period) and IPAP (Intervals of Pulsations with Alternating Period) which are observed on rare occasions. It is also suggested that the Pc1b (0.2-5 s) should be extended to incorporate Pc2b (5-10 s) which from the results in this paper are physically the same phenomenon and could be collectively classified as IPCP (Intervals of Pulsations with Constant Period). (Auth.)

K-31591
Sato, N., Hayashi, K., **Band-limited ELF emission burst (auroral roar),** *Journal of geophysical research,* Apr. 1, 1985 90(A4), p.3531-3535, 15 refs.

A new type band-limited ELF emission burst which is closely associated with impulsive auroral hiss and auroral breakup is identified on the ground at Showa Station. The ELF emissions have a center frequency of 100-350 Hz and a duration of 10-150 s, in which band-limited structures are found in frequency-time displays. In many cases the band-limited structures show falling tone with time. Most of the emissions are observed at the onset of the substorm expansion phase for the limited magnetic local time of 1700-2400 MLT and in the austral winter season of June-August. The new band-limited ELF emission burst is termed "ELF auroral roar" because it is observed with a roaring sound through an audio speaker. (Auth.)

K-31634
Fukunishi, H., Kokubun, S., Matsuura, N., **Aurora and polar upper atmosphere** [Orora to cho koso taiki], Nankyoku no kajaku (Science in Antarctica) Vol.2, Tokyo, National Institute of Polar Research, 1983, 325p., In Japanese. Refs. p.308-320.

The history of 25 years of Japanese upper atmosphere studies at Showa and Mizuho stations and general knowledge on auroras and upper atmosphere physics is outlined. Chapter 1 is an introduction into the nature of auroras and related magnetic and electric phenomena, and into the various methods of observation and instruments. Chapter 2 discusses the forms of auroras as observed both from earth and from space, and deals with high-speed charged particles, their interaction with magnetic fields and their role in the formation of auroras. Changes of auroral forms in time and space are also treated in this chapter. Chapter 3 describes various types of plasma waves, their alignment with magnetic fields of force, and interaction with auroral particles. Chapter 4 takes up the formation and structure of the polar ionosphere, ionospheric and magnetic disturbances, and the energy transfer between magnetosphere and ionosphere. Special conditions in the Antarctic, which require particular precautions and sophisticated methods of observation are touched upon. The bibliography of some 370 items refers mostly to english-language titles, primarily by Japanese and American authors, and some Japanese citations.

K-31668
Mansurov, G.S., Mansurov, S.M., Mansurova, L.G., Borodulin, B.E., **Assessment of reliability of solar-terrestrial relationships from data on sectorial structure of the interplanetary magnetic field using T-criterion in the method of superimposed epochs** [Otsenka dostovernosti solnechno-zemnykh sviazeĭ po dannym o sektornoĭ strukture mezhplanetnogo magnitnogo polia s ispol'zovaniem T-kriteriia v metode nalozhennykh epokh], *Antarktika; doklady komissii,* 1985 No.24, p.192-202, In Russian. 24 refs.

The method of superimposed epochs with a point of reference is discussed as a means to study the relationship of interplanetary magnetic field variations and their effects on man. Data analyses of the psychopathological syndrome, pulmonary hemorrhage and lethal cases in tuberculosis patients are presented.

K-31691
Rastani, K., Inan, U.S., Helliwell, R.A., **DE 1 observations of Siple transmitter signals and associated sidebands,** *Journal of geophysical research,* May 1, 1985 90(A5), p.4128-4140, 19 refs.

VLF signals from the Siple Station transmitter received on the DE 1 spacecraft provide new information on whistler mode signal propagation paths in the magnetosphere. In two case studies, the measured group delay in conjunction with in situ density measurements and ray tracing analysis are used to distinguish between direct nonducted propagation and a hybrid mode consisting of one-hop propagation in a duct followed after ionospheric reflection by nonducted propagation. The extent of the observations both in space and time indicates that such a hybrid propagation mode may be an important means by which whistler mode signals generated or amplified in ducts can populate the magnetosphere. Computed group time delays based on a diffusive equilibrium model for the density distribution along the field lines provide good agreement with measurements over a wide range of magnetic latitudes. In one case, observed Siple signals are associated with sidebands of 30Hz spacing, and emissions are occasionally triggered. Sidebands are associated with signal components that are believed to have propagated on direct nonducted paths as well as in a hybrid (ducted/nonducted) mode with the sideband spacing being equal in both cases. The sideband spacing is found to be independent of the carrier frequency and amplitude and the satellite location with respect to the magnetic equator. (Auth.)

K-31692
Carpenter, D.L., Inan, U.S., Paschal, E.W., **New VLF method for studying burst precipitation near the plasmapause,** *Journal of geophysical research,* May 1, 1985 90(A5), p.4383-4388, 19 refs.

VLF signals in the 2-4 kHz range transmitted from Siple Station, and received at various antarctic locations have been used to detect the occurrence of burst precipitation of electrons into the nighttime lower ionosphere. The receiving stations, each about 1460 km from Siple, were located to the north at Palmer, to the east at Halley and to the south at South Pole. Rapid changes in the received phase and amplitude of the Siple signal ("Trimpi events") were observed in conjunction with the reception of one-hop whistlers. In one case involving propagation paths lying poleward of the plasmapause, amplitude decreases by 20% in 2 s, decaying in 7 s, were recorded simultaneously at Halley and South Pole. In a case of phase perturbations at Palmer, the Siple signal path crossed the plasmapause projection, and the associated whistlers propagated in the outer plasmasphere. Phase measurements appear to be a particularly sensitive means of detecting burst precipitation activity under experimental conditions of the kind described. The length and spatial distribution of the signal paths provide a basis for studying the occurrence and approximate location of burst precipitation in regions outside the observing range of most instruments used for detection of precipitation. Direction finding on correlated whistler events as well as dispersion analysis may be used to increase the spatial resolution of the method. (Auth.)

See also:
E-29015 E-29016 E-29018 F-30356 F-30375 F-30376 G-31554
I-30153 I-30413 I-30501 I-30502 I-31401 I-31622

L. TERRESTRIAL PHYSICS

L-28991

Petrik, G.V., Sergeev, V.N., Kogan, A.L., Vasil'ev, V.P., **Deep seismic studies in West Antarctica,** *Soviet geology and geophysics,* 1983 23(9), p.99-106, For Russian original see 13L-27691. 8 refs.

The results of deep seismic sounding along a 260 km profile in the coastal region of West Antarctica are outlined, confirming the high effectiveness of the differential sounding method, and the TAIGA equipment, under extreme natural conditions. The wave field connected with regional seismic boundaries was analyzed and a seismic cross section, showing structure of the crust and of the upper parts of the mantle, is presented.

L-29007

Neunhöfer, H., Frischbutter, A., Güth, D., **Contribution to Rayleigh wave dispersion in Antarctica and comparison to eastern Europe,** *Gerlands Beiträge zur Geophysik,* 1983 92(5), p.428-434, In English with German and Russian summaries. 16 refs.

For the profile from Scott Base to the South Pole the dispersion of Rayleigh waves has been determined and a shear velocity depth model is proposed. That region can be geologically interpreted as a shield margin and is comparable with adequate regions in eastern Europe. The dispersion of surface waves confirms this similarity in crust and mantle structure not only of the shield but also of its margin in Antarctica and eastern Europe. (Auth.)

L-29114

Kaminuma, K., Ito, K., **Ground tilt observations at Showa Station, Antarctica Part 1. Borehole tiltmeter,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.27-32, 4 refs.

This paper discusses borehole tiltmeter data from April to December 1981. The signals were recorded on a 12-channel chart recorder in the data processing hut, 150 m north from the observation hole. The maximum tilt fluctuation during nine months was 17 microrad in the X-component (E-W) and 24 microrad in the Y-component (N-S). Observed data were corrected for temperature assuming a linear relation between the ground tilt and the underground temperature. The cumulative change of ground tilt during nine months of observation was -1.5 microrad in the X-component and 6 microrad in the Y-component. These observations demonstrate that a true ground tilt can be detected by the borehole tiltmeter. (Auth. mod.)

L-29115

Kaminuma, K., Nagao, T., **Ground tilt observations at Showa Station, Antarctica Part 2. Water-tube tiltmeter,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.33-41, 4 refs.

To observe the secular change of ground tilt in response to deglaciation in Antarctica, a water-tube tiltmeter was installed at Showa Station, in the snow-free area without a vault. The tiltmeter adopted is a moving float type using antifreeze as the fluid and consists of four detectors which measure two tilt components. The detectors were covered with wooden boxes and the water-tubes were covered by airtight polyvinyl chloride tubes. Observations began in April 1981. The records were strongly affected by air temperature and solar radiation. In spite of several problems, ground tilt observation by means of water-tube tiltmeters was possible in the Antarctic region, even if there was no vault for installing the equipment. (Auth.)

L-29118

Nakagawa, I., **Gravimetric connection between Tokyo and McMurdo Sound,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.70-80, 5 refs.

A gravimetric connection from Tokyo to McMurdo Sound via Sydney and Christchurch was carried out by means of two LaCoste & Romberg gravimeters in October 1980 as part of international gravimetric connections around the circum-Pacific zone. The gravimetric connection between Tokyo and McMurdo Sound could not be performed so precisely because scale values of the gravimeters employed could not be accurately determined. The gravity measurements in McMurdo Sound, however, were precisely performed using the two gravimeters in spite of low ambient temperatures. It was ascertained that the International Gravity Standardization Net 1971 (IGSN 71) is a homogeneous network inclusive of the gravity stations in McMurdo Sound. (Auth.)

L-29119

Kasuga, T., Fuchinoue, S., Kaminuma, K., Segawa, J., **Sea gravity measurements in the antarctic regions during the 22nd and 23rd Japanese Antarctic Research Expeditions,** *Tokyo. National Institute of Polar Research. Memoirs,* Oct. 1983 Special issue No.28, Symposium on Antarctic Geosciences, 3rd, 1982, Proceedings, p.81-92, 3 refs.

Sea gravity measurements were conducted on board the icebreaker *Fuji.* Cruise tracks of JARE-22 and -23 have some crossing points in the Antarctic regions. Gravity data at the crossing points were used to calibrate outputs of the sea gravity meter NIPRORI. The icebreaker *Fuji* entered Amundsen Bay for the first time during the cruise of JARE-23. Detailed sea gravity survey in the bay revealed a significant, local free-air gravity low down to -70 mgal in the area. (Auth.)

L-29170

Miller, H., Eckstaller, A., Brodscholl, A., Wallner, K., **Summer season 1982/83 geophysics group** [Sommerkampagne 1982/83 Gruppe Geophysik], *Berichte zur Polarforschung,* Aug. 1983 No.13, p.67-70, In German.

In early February 1983 seismic activity measuring equipment was installed at the foot of a nunatak 150 km SE of Georg von Neumayer Station. A sub-array was also installed on an ice rise about 8 km northwest of the station. These gave points of comparison with the station seismic record. The equipment and its operation are described and the array diagram is shown.

L-29522

Harley, S.L., **Regional geobarometry-geothermometry and metamorphic evolution of Enderby Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.25-30, 22 refs.

DLC QE350.A57 1983

Experimentally calibrated geothermometers and geobarometers have been used to estimate the temperature and pressure conditions of metamorphism and further evolution of granulites from the Archaean Napier Province. These granulites display a variety of exsolution, recrystallization and corona textures, resulting both from cooling and overprinting metamorphism. Compositional data on distinct generations of phases and on zoning patterns in co-existing phases have been used to estimate: (a) peak metamorphic conditions obtained during the first and second major deformation phases (D1 and D2), (b) cooling paths from this peak, and (c) metamorphic conditions prevalent around the time of the third deformation (D3, 2500 Ma). (Auth. mod.)

L-29545

Delisle, G., **Results of palaeomagnetic investigations in northern Victoria Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.146-149, 13 refs.

DLC QE357.A57 1983

Palaeomagnetic measurements on material from radiometrically dated rock complexes from the following locations in northern Victoria Land are presented: (a) Devonian-Carboniferous granites of the Yule Bay area (b) Ferrar Dolerites from Litell Rocks with apparent ages ranging from 90-120 Ma (c) Upper Miocene volcanics from the Hallett Group. Samples collected during the West German Ganovex I and II expeditions were analysed with the aid of AF and thermal demagnetisation techniques. Evaluation of the Devonian-Carboniferous samples from five sites yielded in four cases a mean magnetisation direction with high inclination values, inferring a near pole position of northern Victoria Land at the time. Measurements on samples from one site gave a palaeomagnetic pole position at 46.5 S, 7.6 E. From the Cretaceous dolerites a palaeomagnetic pole at 76.9 S, 201 E based on the mean magnetisation direction of three sites was obtained. Upper Tertiary volcanics from ten sites on Adare Peninsula and four sites from Hallett Peninsula were analysed. The Adare sites yielded a palaeomagnetic pole position at 83.6 S and 186.4 E, the Hallett sites a pole position at 81.9 S and 256.8 E. By combining the Hallett Group data with the mean direction of the Cape Hallett lavas, a mean palaeomagnetic pole position at 89.4 S and 120 E is obtained. This result can be interpreted to imply a geologically younger age for the volcanics of Hallett Peninsula than that of the Adare Peninsula basalts. (Auth.)

L-29555

Jankowski, E.J., Drewry, D.J., Behrendt, J.C., **Magnetic studies of upper crustal structure in West Antarctica and the boundary with East Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.197-203, 29 refs.

DLC QE357.A57 1983

The subglacial structure and geology of West Antarctica is poorly known, yet important to the understanding of the tectonic evolution of Gondwanaland. Simultaneous Radio Echo Sounding (RES) and magnetic data have been collected over West Antarctica. Estimates of maximum depth to magnetic basement were made using an automatic computer method and selected anomalies modeled using a two dimensional inversion programme. These studies were combined with subglacial topographic information, derived from ReS, and all pertinent geological and geophysical measurements to suggest interpretations of subglacial geology. Shallow magnetic basement is associated with volcanic outcrop in northern Marie Byrd Land. Basement deepens below the Byrd Subglacial Basin where volcanics are believed to lie beneath a variable, but thin, cover of Mesozoic-Cenozoic sediments. Asinuous ridge cutting the basin is also believed to be of volcanic origin and probably related to Marie Byrd Land volcanics. The boundary relationships between East and West Antarctica are complex. Previous suggestions of a major fault separating the two are supported by the abrupt boundary visible in RES records in the vicinity of the Horlick Mountains. Identification of their boundary becomes more problematic towards the Thiel Mountains. Limited geological information and the results of this study suggest that the boundary zone probably passes close to the Thiel Mountains in the area between them and the Stewart Hills, Hart Hills and Pagano Nunatak. (Auth. Mod.)

L-29556

McGinnis, L.D., Wilson, D.D., Burdelik, W.J., Larson, T.H., **Crust and upper mantle study of McMurdo Sound,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.204-208, 19 refs.

DLC QE357.A57 1983

Crustal thickness is the fundamental distinguishing characteristic between East and West Antarctica. The boundary between the two is located 15 km offshore in McMurdo Sound. The Sound is underlain by as much as 3.5 km of glaciomarine and preglacial sediments resting upon a crystalline basement identical to that in the dry valleys. Basement is underlain, at depths up to six kilometres, by a nonmagnetic seismic refractor having a velocity near 6.5 km/s. The refractor is believed to consist of granulitic facies, petrologically similar to inclusions found on Hut Point Peninsula. A "preliminary" depth to the mantle is 25 km under western McMurdo Sound. From gravity data it is shown that the mantle descends abruptly from a depth of 25 km at a point 15 km offshore to a depth over 35 km beneath the Strand Moraine. Ignoring the overlying sediments and water depth, crustal thickness increases from about 21 km beneath McMurdo Sound to over 40 km beneath the Transantarctic Mountains. It is assumed that the change in crustal thickness occurred during the Ross Orogeny, one of a series of Early Palaeozoic orogenic epochs that created the boundary between East and West Antarctica. The orogenies were episodes of collision between two plates 20 to 25 km thick, comparable to crustal thicknesses associated with present, passive continental margins. All subsequent tectonic events along the Transantarctic Mountains occurred along the boundary of convergence, a consequence of crustal thickening. Complex modification of West Antarctica and the belt of convergence has continued since the Early Palaeozoic orogenies; however, the integrity of the presently remaining core of East Antarctica has not been seriously compromised since cratonisation.

L-29590

Stagg, H.M.J., Ramsay, D.C., Whitworth, R., **Recent BMR magnetic surveys of the southeast Indian Ocean,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.384-386, 11 refs.

DLC QE350.A57 1983

To mid-1982, a total of approximately 110,000 km of good quality data has been acquired in the area between Melbourne and Hobart and the Australian Antarctic bases of Mawson and Davis. The relative positions of southeast Australia and the Mawson-Davis area have forced a generally northeast-southwest orientation on the *Nella Dan* tracks, oblique to the majority of previous ships tracks. Early indications are that this new direction will allow a more accurate delineation of the locations, trends and frequency of fracture zones and transform faults. Most of the lines proceed closer to the Antarctic margin than earlier data; this should allow better definition of the presently poorly defined anomalies close to Antarctica. Tracks into and out of Mawson are providing a gradual improvement in the magnetic coverage of the Enderby Basin between Enderby Land and the Gaussberg Ridge. It is hoped that data on these tracks will help elucidate the spreading history of this largely unknown area. As a result of the surveys it may be possible to make a revised estimate of the secular variation of the Earth's magnetic field, by comparing magnetic values at line intersections of *Nella Dan* and earlier surveys (principally *Eltanin).* This should lead to a refined version of the Australian Geomagnetic Reference Field, a local improvement to the IGRF in an area where it has been found inadequate. (Auth.)

L-29612

Bentley, C.R., **Crustal structure of Antarctica from geophysical evidence—a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.491-497, 40 refs.

DLC QE350.A57 1983

Where measured in East Antarctica the thickness of the layer overlying the basement complex is mostly less than half a kilometer, and the crust is about 40 km thick. In West Antarctica, the basement complex typically lies 2 or 3 km below the ice and the crust is only 25 to 30 km thick. Gravity measurements show that the crustal transition is abrupt across the Transantarctic Mountain front. Earlier seismic surface wave studies indicated a "typical continental" structure for East Antarctica; more recent measurements along a somewhat different section suggest a typical Precambrian shield. Scanty body-wave evidence on the upper mantle structure beneath East Antarctica also shows typical sub-shield characteristics. In West Antarctica, the crust under the Ross Sea embayment, Byrd Subglacial Basin and Weddell Sea embayment is probably only about 25 km thick. The thick sediments, thin crust, and positive gravity belt in the Ross Sea embayment suggest that it may be a rift zone. Gravity anomalies measured on the Ross Ice Shelf, supported by some seismic refraction measurements of sediment thickness, suggest deep structural control of the submarine and subglacial ridge/trough topography, which could reflect a horst-and-graben structure. That structure disappears abruptly under central West Antarctica, but high seismic velocities typical of deep continental or oceanic crust do occur at shallow depths. Continental palaeomagnetic data suggest at least three microplates in West Antarctica, all separate from East Antarctica. (Auth.)

L-29613

Kadmina, I.N., Kurinin, R.G., Masolov, V.N., Grikurov, G.E., **Antarctic crustal structure from geophysical evidence—a review,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.498-502, 22 refs.

DLC QE350.A57 1983

The principal features of Antarctic crustal structure are derived from an analysis of three major crustal surfaces whose regional characteristics are obtained from available reconnaissance data, viz. the bedrock surface, the "magnetic" basement surface and the Moho. The relief of the two former surfaces is broadly comparable and indicates the abundance of linear neotectonic features such as rifts/grabens which group into transcontinental systems and are clearly reflected in the behavior of the Moho and Conrad interfaces. The "magnetic" basement of cratonic terrains and sedimentary basins is believed to consist mainly of Lower Precambrian crystalline basement rocks overlain by upper Precambrian to Lower Palaeozoic sequences whereas in orogenic areas it probably includes both the remobilised ancient infrastructure and surrounding Phanerozoic complexes. Crustal profiles for selected areas are compiled on the basis of integrated interpretations of gravimetric, magnetic and seismic data to illustrate the major types of Antarctic crustal structure and its reworking by riftogenic processes. It is suggested that the unique intensity of rifting which leads to disintegration of the Antarctic continental landmass may be related, at least partly, to the presence of an ice sheet capable of affecting the tectono-thermal regime at lower crustal levels and a possible mechanism of this influence is discussed. (Auth.)

L-29614

Ritzwoller, M.H., Bentley, C.R., **Magnetic anomalies over Antarctica measured from MAGSAT,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.504-507, 31 refs.

DLC QE350.A57 1983

MAGSAT satellite vector magnetic anomaly data have been used to create a scalar magnetic anomaly map over Antarctica and the nearby oceans. The temporal stability of the anomaly features, together with their correlation with well-known oceanic tectonic structures, indicates that the source of the observed anomalies lies within the Earth. Specifically, magnetic anomalies are associated with oceanic basins (negative) and ridges (positive) and with such continental features as tectonic provinces (positive and negative), hypothetical rift features (negative), several mountain ranges (positive and negative), and a subglacial basin (positive). At least two of the largest magnetic anomalies in Antarctica are mirrored by anomalies at the corresponding locations in other Gondwana continents. The map appears to possess information relevant to the large-scale structure and development of Antarctica, but must be used with care due to ambiguities inherent in its interpretation. (Auth.)

L-29615

Ikami, A., Ito, K., Shibuya, K., Kaminuma, K., **Crustal structure of the Mizuho Plateau, Antarctica revealed by explosion seismic experiments,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.509-513, 22 refs.

DLC QE350.A57 1983

From 1979 to 1982, explosion seismic experiments were carried out near Showa Station and in the northern Mizuho Plateau. The primary object of these experiments was to investigate a velocity/depth profile of the crust and upper mantle. The biggest explosion was fired in the sea near Showa Station, and 27 temporary seismic observation stations were set up along a 300 km long profile between Showa and Mizuho Stations. In addition to this, two big explosions in ice holes were fired at the southern end and the middle point on this profile. Refraction waves from the Conrad and the Moho discontinuities were successfully recorded. The apparent P-wave velocity in the upper crust ranges from 6.0 km/s to 6.4 km/s, suggesting a gradual increase with depth. Apparent velocities of 6.9 km/s for the Conrad discontinuity and 7.9 km/s for the Moho discontinuity were observed from the biggest shot near Showa Station, but the true velocities could not be determined. The crustal structure in the northern Mizuho Plateau was determined from travel times, and the depth of the Conrad and Moho discontinuities were defined as about 30 km and about 40 km, respectively. (Auth.)

L-29617

Kaminuma, K., Shibuya, K., **Geophysical investigation in the eastern part of Lützow-Holm Bay, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.519-521, 6 refs.

DLC QE350.A57 1983

Almost all gravity stations on the snow free area in the eastern part of Lützow-Holm Bay have negative free air anomalies from -15 to -35 mgal. The free air anomaly in the central part of Lützow-Holm Bay is as low as -90 mgal and increases gradually towards the eastern coast of Lützow-Holm Bay. The Bouguer anomalies in the northern part of Lützow-Holm Bay are about 44500-45400 gamma. A borehole type and a set of water tube tiltmeters were installed at Showa Station in 1981. An annual change of 12 microradian (maximum) in an E-W direction and 22 microradians (maximum) in a N-S direction was observed from April 1981 to January 1982. The annual change corresponds to the temperature variation of the subsurface at a depth of 1 m at which observation was also started at Showa Station in 1980. (Auth.)

L-29618

Wellman, P., **Interpretation of geophysical surveys—longitude 45 to 65 E, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.522-526, 22 refs.

DLC QE350.A57 1983

Outcropping rocks from Enderby, Kemp and Mac. Robertson Lands, Antarctica have previously been divided into two main groups, an Archaean age Napier Complex of granulite metamorphic grade, and a Late Proterozoic age Rayner Complex that was largely formed by remetamorphism of the older rocks, generally to a slightly lower metamorphic grade. Rock type boundaries are here mapped between outcrops using both medium wave length magnetic anomalies, and the apparent susceptibility of rock topography inferred from the correlation between short wave length magnetic anomalies and short wave length topography. Both apparent susceptibility and medium wavelength anomalies are average to slightly low over the Napier Complex, very high over the non charnockitic part of the Rayner Complex, and high over the charnockitic part. The correlation of short wavelength magnetic anomalies with rock topography, and the results of Werner deconvolution of the magnetic profiles, are both consistent with the rock surface under ice cover corresponding to magnetic basement. Hence, an appreciable thickness of non magnetic sediments is not likely to be present in this part of the landmass of Antarctica. Maps of Faye gravity anomalies and smoothed rock altitude have almost identical medium wavelength features. It is inferred from this that isostatic compensation of topography is both regional and deep, and that the upper crustal rocks have a nearly constant density. (Auth.)

L-29626

Grindley, G.W., Oliver, P.J., **Palaeomagnetism of cretaceous volcanic rocks from Marie Byrd Land, Antarctica,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.573-578, 25 refs.

DLC QE350.A57 1983

Palaeomagnetic determinations from 26 widely separated sites (42 oriented blocks) from Upper Cretaceous rhyolitic volcanics and mafic dyke swarms in the Ruppert/Hobbs Coast sector of Marie Byrd Land define a mean direction of stable magnetisation. The sampled rocks post-date the emplacement of Lower Cretaceous calc-alkaline granite plutons and are associated with the early stages of rifting of the South Pacific oceanic basin. All sampled rocks are normally magnetised and were emplaced during the long Late Cretaceous epoch of normal polarity as indicated by radiometric dates (90-110 Ma). No evidence for significant post-emplacement remagnetisation or tectonic disturbance was found. The Cretaceous palaeopole position for Marie Byrd Land lies significantly eastward of the Apparent Polar Wander Path (APWP) for Australia and New Zealand, reconstructed by reversal of sea-floor magnetic anomalies on to Antarctica. This might indicate minor extension and/or dextral rotation along a plate boundary with East Antarctica. This palaeomagnetic study does not support speculations that Marie Byrd Land is an exotic microplate that drifted into its present position in the Late Cretaceous or Early Tertiary. Indeed, the evidence is consistent with Marie Byrd Land being an eastward extension of New Zealand and the Campbell Plateau. (Auth.)

L-29631

McGregor, P.M., McEwin, A.J., Dooley, J.C., **Secular motion of the south magnetic pole,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.603-606, 10 refs.

DLC QE350.A57 1983

The Earth's magnetic poles are those places where a freely-suspended magnetic needle would stand vertically—i.e. where the angle of dip is 90 deg. Douglas Mawson and his two companions from Shackleton's "Nimrod" expedition were the first and only persons to stand at the south magnetic pole (SMP) which they reached on 16 January 1909. They fixed its position (72.4 S, 155.3 E, in Victoria Land) by direct measurements, but since then it has been determined mainly from analyses of global magnetic observatory and survey results. Thus, from the 1980 analysis, the sMp is estimated now to be about 1000 km to the NW of Mawson's location, some 100 km out to sea from the French station Dumont d'Urville. This motion of the magnetic (or dip) poles contrasts with that of the geomagnetic (or dipole) poles which have been stationary for at least 150 years. Such motion is a manifestation of the general secular variation of the Earth's internal magnetic field, and in common with other features is erratic and not accurately predictable. Because secular variations are thought to be due to localised current systems near the surface of the earth's core, it is to be expected that the north and south magnetic poles have independent characteristics—e.g. they are not antipodal. Although their motions are not synchronous their average rates and directions during this century have been similar: 10-15 km per annum north to northwesterly. (Auth.)

L-29632

Vogt, P.R., Cherkis, N.Z., Morgan, G.A., **Project investigator-I: evolution of the Australia-Antarctic Discordance deduced from a detailed aeromagnetic study,** Antarctic earth science; fourth international symposium. Edited by R.L. Oliver, P.R. James and J.B. Jago, Cambridge University Press, 1983, p.608-613, 16 refs.

DLC QE350.A57 1983

A detailed aeromagnetic study over the Australia-Antarctic Discordance (AAD) and adjacent portions of the Southeast Indian Ridge (SEIR) exposes the kinematic details of plate boundary evolution over the last 25 Ma. The present crenulated geometry of the AAD developed from a combination of continuous asymmetric spreading along most of the boundary (north flank faster by 5mm/year), and propagating rifts which abruptly changed the offsets of the transforms bounding the AAD. Rift propagation may have been initiated by a change in rotation pole 7 to 4 Ma, and also by asthenosphere flow towards the AAD along adjacent spreading centres. Continuous asymmetric spreading in the AAD area has been episodic, with maximum asymmetry (ca. 10-15 mm/year) at 2-3 Ma intervals. (Auth.)

L-29646

Masolov, V.N., Kurinin, R.G., Grikurov, G.E., **Deep structure of antarctic rift zones and their role in the tectonic structure of the earth's crust** [Glubinnoe stroenie riftovykh zon Antarktiki i ikh rol' v tektonicheskoĭ strukture zemnoĭ kory], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.16-29, In Russian. 12 refs.

Based on geophysical data, the distribution of antarctic rift zones on the continent as well as on the continental shelf is discussed and illustrated. An attempt is made to demonstrate the connection between the rift formation and the destructive role it played in the evolution of antarctic crust in the Cenozoic. It is argued that the same mechanism could explain the disintegration of Gondwanaland as a whole.

L-29652

Oborina, S.F., Sytinskiĭ, A.D., **Seismic investigations in Antarctica** [Seĭsmicheskie issledovaniia v Antarktike], 25 let Sovetskoĭ antarkticheskoĭ ekspeditsii. (25 years of Soviet antarctic expeditions). Edited by E.S. Korotkevich and L.I. Dubrovin, Leningrad, Gidrometeoizdat, 1983, p.74-93, In Russian. 34 refs.

Seismic investigations carried out by the Soviet antarctic expeditions over a period of 25 years are discussed. Seismic maps of Antarctica, for the 1910-1960 and 1961-1979 periods, are presented, as are graphs and tables showing surface wave dispersion and average crustal thickness in Antarctica and the southern ocean. Earthquake epicenters are located along the antarctic coastline. Dynamic processes of the antarctic ice cover are determined on the basis of seismic observations at Mirnyy Station. Ice sheet flow is estimated on account of iceberg calvings. Hydrometeorological conditions related to the development of microseisms are also investigated.

L-29741

Rydelek, P.A., Knopoff, L., **Spectral analysis of gapped data: search for mode 1S1 at the South Pole,** *Journal of geophysical research,* Mar. 10, 1984 89(B3), p.1899-1902, 10 refs.

The exigencies of operating an ultralong-period seismometer/-gravimeter at the South Pole have obliged us to search for evidence for the pendulum mode of the earth's inner core as a signal with poor signal-to-noise ratio, recorded with lengthy interruptions in the time series. In our method for identifying a weak, almost harmonic time signal in the presence of record gaps, we assume the signal is phase coherent for the full time series across the gaps and perform Fourier analysis of the full data sequence. The signal-to-noise ratio is improved by 1(M)1/2 over the case where individual gapped segments are summed, where M is the number of segments. Analysis of the recordings from the South Pole both before and after the Sumbawa earthquake shows no spectral line identifiable with the pendulum mode that is above the noise level. (Auth.)

L-29791

Bergman, E.A., Nábělek, J.L., Soloman, S.C., **Extensive region of off-ridge normal-faulting earthquakes in the southern Indian Ocean,** *Journal of geophysical research,* Apr. 10, 1984 89(B4), p.2425-2443, 77 refs.

An unusually large number of off-ridge earthquakes has occurred within a broad region astride the Southeast Indian Ridge. The source mechanisms of nine of these earthquakes, in lithosphere from 4 to 27 m.y. old, have been determined with a formal inversion technique based on matching observed and synthetic P and SH waves. All events occur in the oceanic mantle, from 8 to 22 km below the seafloor. The seismic moment and duration of faulting obtained from the inversion constrain the stress drop to lie between a few tens of bars and a few hundred bars for most of the events. All of the off-ridge earthquakes are characterized by normal-faulting mechanisms, with the T axes nearly parallel to the nearby ridge axis, in sharp contrast to typical mid-ocean ridge or intraplate earthquakes. No single mechanism is adequate to explain all the observed off-ridge normal-faulting earthquakes. An apparent asymmetry in the observed seismicity with respect to the ridge suggests that the earthquakes on the Antarctic and Indian plates are caused by different processes. The Antarctic plate events can be satisfactorily attributed to the release of thermal and bending stresses associated with a residual depth anomaly between the Kerguelen Plateau and the Southeast Indian Ridge, a region which has been suggested as the site of horizontal "pipe" for flow in the asthenosphere from the Kerguelen hot spot to the vicinity of Amsterdam and St. Paul islands on the Southeast Indian Ridge. (Auth. mod.)

L-29928

Shibuya, K., **Aeromagnetic survey around Syowa Station, Antarctica. 1. Flights No.11-M2 by JARE-21,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.89, p.1-58, 6 refs.

This report on aeromagnetic studies around Showa Station gives the complete intensity data of five, among twenty, flights by JARE-21 together with the corresponding flight logs and the compiled synthetic diurnal variations.

L-29929

Kaminuma, K., Nagao, T., **Gravity survey in Lützow-Holm Bay and the Mizuho Plateau, East Antarctica, 1981,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.89, p.59-87, 9 refs.

From April to December 1981 gravity measurements were carried out by the JARE-22 in the Lützow-Holm Bay region and a total of 304 gravity stations were established. Of these, 117 are in the ice-free areas around the Soya Coast, 118 are in the Mizuho Plateau and the Yamato Mountains, and 68 on sea ice in Lützow-Holm Bay. The tabulated results are presented.

L-29930

Shibuya, K., **Seismological bulletin of Syowa Station, Antarctica, 1982,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1984 No.92, 75p., 17 refs.

Digital seismic data acquisition systems, replacing the optical-electromagnetic seismographs at Showa Station, are discussed and their outline is schematically illustrated. Seventy-nine teleseismic events are tabulated and their locations are mapped.

L-29979

Segawa, J., Kasuga, T., Kaminuma, K., **Surface ship gravity meter NIPRORI-1,** *Marine geodesy,* 1983 (1-4), p.271-290, 2 refs.

A new surface ship gravity meter, NIPRORI-1, developed for regular use in antarctic research is described. The meter employs a servo-accelerometer and a precision gyro-controlled platform. Gravity measurements were conducted during the Japanese Antarctic Research Expeditions from 1979 through 1982. The performance of NIPRORI-1 was very promising. The area of measurements covered the Antarctic over a distance of more than 30,000 km. From these measurements valuable data about gravity anomalies at the continental shelves of Antarctica were obtained, particularly those data off the coast of eastern Antarctica near Showa Station.

L-30098

Ito, K., Ikami. A., Shibuya, K., Kaminuma, K., **Upper crustal structure beneath the Ongul Islands, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 Ser C No.15, p.3-12, 9 refs.

Two explosion seismic experiments were conducted in 1980. In one experiment eleven stations were established along a line 5.2 km long at intervals of about 0.5 km on the outcrops on East and West Ongul Islands and two explosions of 100 and 80 kg were fired at the bottom of the sea. The other smaller-scale experiment was made on East Ongul Island to reveal the structure shallower than that obtained by the above-mentioned experiment. In both experiments direct waves were clearly recorded at all the stations as first arrivals. The mean apparent velocity and the mean average velocity of *P*-waves are 6.19-0.11 and 5.74-0.88 km/s, respectively. The obtained velocity in the ice-free area of the Ongul Islands is nearly the same as the velocities under the ice sheet in East Antarctica obtained by the research expeditions of the United States, USSR and Japan. (Auth. mod.)

L-30100

Ikami, A., Ito, K., **Deep crustal structure along the profile between Syowa and Mizuho Stations, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Feb. 1984 Ser C No.15, p.19-28, 17 refs.

Twenty-seven temporal seismic observation stations were set up along a 300-km long profile from Showa to Mizuho Stations. Explosives were fired near Showa Station, near Mizuho Station and at the middle point of the profile. The apparent *P*-wave velocity in the upper crust varies from 6.0 to 6.4 km/s, suggesting a gradual increase of the *P*-wave velocity with depth. Apparent velocities of 6.9 km/s for P-star and 7.9 km/s for P-n were observed from the biggest shot near Showa Station. From analyses of travel times and an amplitude study by synthetic seismograms, the crustal structure of the northern Mizuho Plateau was determined. The depth of the Conrad and the Moho discontinuities was determined as about 30 km and 40 km, respectively. Comparing our results with those in Dronning Maud Land velocity values are nearly the same, but the thickness of lower crust in the northern Mizuho Plateau is about half of that in Dronning Maud Land. (Auth. mod.)

L-30218

Bankwitz, P., **Problem-oriented geological interpretation of satellite photographs** [Problemorientierte geologische Interpretation von Satellitenaufnahmen], *Gerlands Beiträge zur Geophysik,* 1983 92(2-4), p.197-220, In German with English and Russian summaries.

Satellite images contain geological information of different interpretation levels, which are condensed in the levels of the images. They have to be correlated with geological structures, which can be characterized according to their wavelengths and amplitudes. These parameters depend on the heights at which the images were taken; they are reflected in the interpretation levels. Photographs of the Schirmacher Ponds region are used in explaining interpretation practices. (Auth. mod.)

L-30239

Nagata, T., **Geophysical studies on Mount Erebus,** *Antarctic journal of the United States,* 1983 18(5), p.38-41, 3 refs.

International Mount Erebus seismic studies (IMESS) conducted during the 1982-83 field season by Japanese scientists staying at McMurdo Station are summarized. The following research programs were conducted: seismic observations by telemetry network, observations by temporary seismic network, and gravity measurements. The daily number of volcanic earthquakes occurring in and around Mount Erebus from Sep. 14 to Dec. 24, 1982 is shown. An extreme earthquake swarm with more than 680 earthquakes and extreme volcanic tremors were recorded Oct. 8 and 9, 1982.

L-30248

Rydelek, P.A., Knopoff, L., **Long-period solar tides at the South Pole,** *Antarctic journal of the United States,* 1983 18(5), p.59-60, 4 refs.

Amundsen-Scott South Pole Station is uniquely located for observing both the lunar and solar long-period vertical Earth tides. At the South Pole these tides have maximum amplitude. From several year-long records the gravimetric factor and phase angle for the lunar semimonthly tides and the gravimetric factor for the lunar monthly and termonthly tides have been determined. The spectral estimates show the presence of a strong semiannual component along with other smaller components at annual and terannual periods. A tidal origin is indicated for the semiannual component. The causes of semiannual fluctuations in pressure and temperature observed at the South Pole are as yet unresolved.

L-30271

Watts, D.R., Watts, G.C., Bramall, A.M., **Cretaceous and early Tertiary paleomagnetic results from the Antarctic Peninsula,** *Tectonics,* June 1984 3(3), p.333-346, 24 refs.

When combined with previously published data, results show construction of a polar wander path that is very similar to one derived for the East Antarctic craton by rotating Tertiary and Cretaceous poles from India and Australia into the Antarctic frame of reference. When considered in this context, the paleomagnetic data from the Orville Coast, which was previously interpreted as evidence in favor of oroclinal bending or relative rotation of the southern Antarctic Peninsula with respect to the northern part, may be considered as an *in situ* result. The implications of the new data are: (1) The Antarctic Peninsula down to the Orville Coast has been a part of the Antarctic plate since 100 m.y. ago. (2) Movement of the Antarctic Peninsula required to avoid overlap in reconstructions of Gondwanaland must have occurred before 100 m.y. ago. (Auth.)

L-30398

Bentley, C.R., Shabtaie, S., Lingle, C.S., Blankenship, D.D., **Analysis of geophysical data from Dome C and the Ross Ice Shelf,** *Antarctic journal of the United States,* 1983 18(5), p.104-105, 10 refs.

Geophysical data from Dome C and the Ross Ice Shelf are summarized under the following headings: electrical resistivity studies: soundings and computer modeling; seismic studies; subglacial geology at Dome C; and retreat of ice streams in the Ross Sea embayment. It has been demonstrated that electrical resistivity soundings can be used to estimate the depth at which the Recent-Wisconsin boundary exists. Further, it may be possible, using resistivity soundings, to trace the climatic boundary in an ice sheet by making measurements at stations along a flow line. Studies of the subglacial lithology at Dome C imply that the rock is most likely andesite or basalt and that this portion of the continent was located at a high magnetic latitude when the rock was emplaced. Work has continued on the development of a numerical model of a polar ice stream that is grounded below sea level.

L-30409

Yuen, D.A., Schubert, G., **Global deformation of the Earth caused by large-scale continental glaciation: implications for the evolution of ice ages and the averaged thickness of the lithosphere,** *Antarctic journal of the United States,* 1983 18(5), p.121-122, 9 refs.

Recently the phenomenon of true polar wander since the late Cretaceous has been the subject of a number of investigations since it may have a bearing on the diverse areas of mantle convection and the evolution of ice ages. Such types of polar motions can influence as well the characteristic time scale of ice ages from earlier geological epochs, such as the Silurian which took place some 400 million years ago. It is suggested that true polar wander may furnish a mechanism which could eventually terminate the ice-age cycles. This premise is explored.

L-30475

Hart, S.R., **Large-scale isotope anomaly in the Southern Hemisphere mantle,** *Nature,* June 28, 1984 309(5971), p.753-757, 47 refs.

Basalts from many Southern Hemisphere regions have anomalous Sr and Pb isotopic characteristics. This article shows that the isotopic mantle anomaly is globe-encircling in extent, centred on latitude 30 S. Arguments suggesting that this mantle anomaly has been in existence for billions of years place severe constraints on mantle convection models. Maps are included showing the global extent of the anomaly and these were augmented by data from the subantarctic islands and from coastal stations in Antarctica. (Auth. mod.)

L-30620

Nagao, T., **Topographic features around Syowa Station as viewed from gravity measurements—some implications on the bedrock topography under the ice sheet,** *Antarctic record,* Aug. 1984 No.82, p.20-29, In Japanese with English summary and figure captions. 8 refs.

The coefficients of correlation between the reduced gravity anomaly and the bedrock height were calculated using gravity data in the Lützow-Holm Bay region and on Mizuho Plateau. A good positive relationship between the bedrock height and the reduced gravity anomaly was found on the sea ice and in the ice-free area of Lützow-Holm Bay and in the ice-free area of the Yamato Mountains. On the contrary, the correlation between the reduced gravity anomaly and the bedrock height at gravity stations on the ice sheet whose ice thickness was measured by an ice radar survey showed a weak negative relationship. This fact may suggest that the determination of ice thickness by an ice radar on the ice sheet was inaccurate. The negative relationship between the reduced gravity anomaly and the bedrock height in the Mizuho Plateau means that the isostasy of this area is incomplete. (Auth.)

L-30647

Grushinskiĭ, N.P., **Gravimetric determinations in Antarctica and their interpretation,** Antarctic Committee reports, No.17. Edited by G.A. Avsiuk, New Delhi, Amerind Publishing Co., 1984, p.256-267, TT 79-52012, For Russian original see 10L-21703. 15 refs.

Gravimetric research in Antarctica and the evolution of concepts about the basic features of subglacial relief and the earth's crust are described. Averaged gravimetric maps and a figure showing thickness of the crust, constructed using data from deep seismic sounding, are included. (Auth.)

L-30750

Adams, R.D., Zhang, B.M., **Further earthquake on the Kerguelen Plateau,** *Geophysical journal,* Nov. 1984 79(2), p.697-703, 9 refs.

The "search" procedure of the International Seismological Centre for previously unreported earthquakes has located a further earthquake on the eastern edge of the Kerguelen Plateau, about 1200 km SSE of Kerguelen Island. This event (Mb 4.7) occurred on 1981 April 6, and was about 65 km west of a larger event (Mb 5.2) that occurred in 1973. These two earthquakes are the only ones known to have occurred on the Plateau, apart from three events close to Kerguelen Island. The position of the new event is about midslope on the steep eastern edge of the Plateau, and analysis of depth phases confirms that it occurred in a water depth of 2.2 km, with a focal depth of 10-12 km beneath the seafloor. Similar analysis of the earlier event, which is beneath the bottom of the slope, places it at a depth of 20-25 km, near the base of the crust, and indicates that there is a likely thickness of about 1 km of unconsolidated sediment in this area. (Auth.)

L-30757

Schäfer, U., **Magnetic measurements in the region of the Schirmacher Oasis (Queen Maud Land) during the 25th SAE and preliminary data interpretation** [Magnetische Vermessung im Gebiet der Schirmacher Oase (Königin-Maud-Land) während der 25. Sowjetischen Antarktisexpedition und erste Interpretationsergebnisse], *Geodätische und geophysikalische Veröffentlichungen, Reihe 1,* 1983 No.9, Symposium zur Antarktisforschung der DDR, Garwitz 1982, p.18-30, In German with English and Russian summaries. 16 refs.

Relations between the geomagnetic anomaly field and structural geologic features are derived from photomaps. The magnetic anomaly pattern confirms the distribution of definite rock series and a fault zone within the oasis. The interpretation of magnetic measurements with regard to results of other geophysical investigations made on the surrounding glaciers allowed conclusions about texture and composition of the earth's crust in the ice shelf region of the northern marginal zone of the Antarctic continent. The measuring method is described and supplemented by a data catalogue.

L-30879

Lindner, K., **Experimental gravity measurements on shelf ice** [Gravimetrische Versuchsmessungen auf Schelfeis], *Zeitschrift für Vermessungswesen,* Apr. 1984 109(4), p.186-187, In German with English summary.

Possibilities of gravity measurements on antarctic shelf ice are explored. By application of a calculating digital multimeter which contains an averaging program an accuracy better than .0000001/sq m during a measuring time of 5 minutes was reached. This result is valid only under the assumption of a free swinging beam. (Auth.)

L-30909

Nagao, T., Kaminuma, K., **Estimation of the crustal structure and the bedrock topography by the gravitational method around Syowa Station, East Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.1-8, 13 refs.

Gravity survey was carried out at 303 stations in Lützow-Holm Bay and in the Mizuho Plateau during the wintering in 1981. Using the gravity data, the crustal structure in the Lützow-Holm Bay region and the bedrock topography in the Mizuho Plateau have been revealed in this study. The results are as follows: In Lützow-Holm Bay, the thickness of the crust increases from northwest to southeast. In the Mizuho Plateau, at least two subglacial valleys exist near Mizuho Station, whose strike is estimated to be consistent with the flow direction of the ice sheet. In the Yamato Mountains region, the crustal thickness is larger than that in the Lützow-Holm Bay region by about 3.8 km estimated from the result of simple Bouguer anomaly difference. And the difference of the crustal thickness between Showa and Mizuho Stations is less than 2 km. (Auth.)

L-30911

Yukutake, H., Ito, K., **Velocities of *P* and *S* waves for drilling core rocks at Syowa Station, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.17-27, 18 refs.

Velocities of compressional and shear waves for drill core samples at Showa Station are measured at confining pressure up to 0.5 GPa (5 kbar). The samples consist predominantly of granitic complex or gneiss older than 350-533 m.y. in the shield region. Measurements of *P* wave velocities for three orthogonal directions and *S* wave velocities for two orthogonal directions reveal anisotropy of the rocks. Velocities increase rapidly with increasing pressure at low pressures below 50-120 MPa due to crack closure. Velocities increase linearly with increasing pressure at higher pressures than 50-120 MPa, but velocities for each direction are nearly the same. A velocity model in the upper 20 km of the crust is estimated from laboratory data, assuming an appropriate temperature profile. The proposed model of *P* wave velocity increasing gradually with depth is consistent with the upper crustal structure obtained by the explosion seismic experiments in the Ongul Islands and the Mizuho Plateau. (Auth.)

L-30913

Kaminuma, K., Koyama, E., Ueki, S., **Preliminary report of the gravity survey in Ross Island, Antarctica,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.41-46, 4 refs.

Gravity surveys were carried out on Ross Island during the austral summer of 1982-1983. Twenty-one gravity stations were established in the summit area of Mount Erebus and eleven stations in the other area of Ross Island. The Bouguer gravity anomaly distribution shows a possibility of the maximum positive anomaly in the northeast side of the Erebus main crater, though the gravity stations are sparse there. This might be due to the fact that the structure of Mount Erebus is not a caldera type but nearly of the same type as the Kilauea Volcano of Hawaii Island and the O Sima Volcano of Japan. (Auth.)

L-30914

Segawa, J., Kaminuma, K., Ueda, Y., **Sea gravimeter of the icebreaker *Shirase*,** *Tokyo. National Institute of Polar Research. Memoirs,* Sep. 1984 Special issue No.33, p.48-60, 5 refs.

The gravimeter system of the *Shirase* is the NIPRORI-1 sea gravimeter which was transferred from the icebreaker *Fuji*. During installation on the *Shirase* some changes for adaptation as well as some improvements for enhancing the capabilities were made. The main differences are as follows: The gravity sensor unit and the data processing unit were installed in separate rooms. An air-cushioned board was placed in the gravity sensor room in order to reduce vibration of the floor caused by the engines. The data processing unit was expanded, and computers and floppy disks were doubled. Temperature regulation of the gravimeter was improved, so that it became possible to detect the tidal variation of gravity by the use of the existing gravity sensor. The operation by interrogation software element was improved and the noise filtering was refined. (Auth.)

L-31048

Dikstra, B.J., **Aeromagnetic survey of Alexander Island and parts of Palmer Land: a preliminary report,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.229-231, 3 refs.

An aeromagnetic survey was flown over Alexander Island and parts of Palmer Land in the southern summer of 1975-76. A brief description of the equipment and a discussion of navigational methods is given. The completed flight network is shown. (Auth.)

L-31050

Butler, P.F., McArthur, M., **Regional Bouguer anomaly map of north-western Palmer Land,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.245-249, 15 refs.

A regional gravity survey of north-western Palmer Land is described. The data are presented as a Bouguer anomaly map and discussed in relation to the geology of the area. (Auth.)

L-31051

Butler, P.F., **Detailed magnetic and gravity surveys of part of the north Fillières Coast of Graham Land,** *British Antarctic Survey. Bulletin,* Dec. 1983 No.52, p.251-252, 4 refs.

Detailed magnetic and gravity surveys are described for the area of McClary, Todd and McMorrin Glaciers, north Fallières Coast of Graham Land. Contoured magnetic field and Bouguer anomaly values are given. (Auth.)

L-31152

Mishra, D.C., **Magnetic anomalies—India and Antarctica,** *Earth and planetary science letters,* Nov. 1984 71(1), p.173-180, 19 refs.

Magnetic anomalies over the continental shelf off the east coast of India suggest the presence of a highly magnetic rock type magnetized with an intensity of 900 nT in a direction, azimuth *(A)* = 150 deg and inclination *(I)* = +65 deg. This suggests the occurrence of igneous volcanic rocks which is confirmed from samples found below Tertiary sediments from a few boreholes in this region. A small strip of the body near the continental shelf margin appears, however, to possess normal magnetization suggesting the occurrence of normal and reversed polarities side by side, a characteristic typical for oceanic magnetic anomalies. The reversed polarity of the rocks on the continental shelf suggests that they correspond probably to the M0 reversal (115 m.y.) on world magnetostratigraphic scale and provide a paleolatitude of 47 S for the land mass of India which agrees with the palaeoreconstruction of India and Antarctica. In this reconstruction, the Mahanadi Gondwana graben on the Indian subcontinent falls into line with the Lambert Rift in Antarctica, suggesting a probable common ancestry. The volcanic rocks on the continental shelf off the east coast of India might represent a missing link, that is, rocks formed between India and Antarctica at the time of the break-up of Gondwanaland. (Auth. mod.)

L-31224

Hebert, D., **Investigation of the postglacial isostatic coastal uplift of Enderby Land (East Antarctica) on the basis of C-14 dating results** [Untersuchungen zur nacheiszeitlichen isostatischen Küstenhebung des Enderby-Landes (Ostantarktika) auf der Grundlage von 14C-Datierungsergebnissen], *Petermanns geographische Mitteilungen,* 1984 128(3), p.183-188, In German with English and Russian summaries, p.247-248. 33 refs.

Organic samples (moss, lichens, penguin guano, sediment) from the coast of Molodezhnaya (Enderby Land) were dated by means of C-14 analyses. In consideration of age and locality elevation above sea-level the mean rate of isostatic coastal uplift for the last 2,000 years has been determined at about 2 m/100 years. The rate of uplift decreases and is about 1 m/100 years at present. The interpreting model is applied to C-14 ages published for varied materials from other stations. The results indicate a considerable postglacial uplift of the East Antarctic coast of a least 100 m while there was not any noticeable uplift in the range of the Transantarctic Mountains, as expected. The results are classified under climatological aspects. (Auth.)

L-31236

Schäfer, U., **Schirmacher Oasis in Queen Maud Land: first results of geomagnetic measurements** [Die Schirmacher-Oase im Königin Maud-Land: erste Ergebnisse geomagnetischer Vermessungen], *Zeitschrift für geologische Wissenschaften,* 1984 12(5), p.375-386, In German with English and Russian summaries. 18 refs.

The Schirmacher Oasis magnetic anomaly pattern derived from aerial photography shows a coincidence with structural geological features and rock formations. Magnetic anomalies in the ice shelf region 10-20 km and 50-60 km north of the Schirmacher area indicate possible unstable zones at the boundary between continental and transitional crusts. Geophysical data suggest that in this part of Queen Maud Land the marginal zone has been formed by a set of downthrow faults up to the shelf region. Two east-west striking, deep-seated faults in the ice shelf area are characterized by intensive magnetic anomalies. These anomalies are assumed to be connected with intrusions of basic magmatic rocks along the faults. Such tectono-magmatic processes are associated with fault tectonics from the beginning decay of the Gondwana continent. (Auth.)

L-31402

Storey, B.C., Garrett, S.W., **Crustal growth of the Antarctic Peninsula by accretion, magmatism and extension,** *Geological magazine,* Jan. 1985 122(1), p.5-14, 74 refs.

A subduction-accretion model incorporating new geophysical data is presented to explain the geology of the Antarctic Peninsula from late Palaeozoic to Cenozoic time. According to the model, the peninsula consists of overlapping accretionary, magmatic and extensional regimes that were diachronous across the peninsula and have built the crust to its present form. The crust, which contains a small proportion of sialic basement, was mainly formed by accretionary and magmatic processes and modified to its present shape by extension. The Gondwanide Orogeny for the Antarctic Peninsula is interpreted in terms of the accretionary processes. (Auth.)

L-31442

Vashchilov, IU.IA., Stroev, P.A., **Some structural features of the Antarctic Ocean and Antarctica according to gravity data,** *U.S. Defense Mapping Agency Aerospace Center. Report,* Jan. 1974 DMAAC-TC-1993, 19p., AD-775 876, 25 refs. For Russian original see 7L-12306.

The gravity field over the belt extending from 60 deg to the shores of the Antarctic continent was studied according to a procedure based on the concept of global plate movement. The method involved quantitative data interpretation by bilogarithmic nomograms and by statistical analysis. Quantitative interpretation of Bouguer anomalies allowed delineation of blocks with varied density determination of depths to the upper and lower boundaries of the blocks and density differences at the interfaces between the blocks. The results are discussed from geological and geophysical viewpoints.

L-31597

Shibuya, K., Kaminuma, K., Ikami, A., Ito, K., **Magnetic anomalies along the traverse route from Syowa to Mizuho Stations, East Antarctica,** *Antarctic record,* Dec. 1984 No.83, p.51-61, In Japanese with English summary. 13 refs.

The 21st Japanese Antarctic Research Expedition (JARE-21) made aeromagnetic surveys along the traverse route from Showa to Mizuho stations by using a proton precession magnetometer. Reductions of International Geomagnetic Reference Field and diurnal variations were applied to the observed total intensity data, and the geomagnetic anomaly profile along the route was obtained. The uncertainty in the anomaly profile is considered to be 20-30 nT. There is a characteristic anomaly around S16-S30 which ranges from -250 to 350 nT. There is also another anomaly from H260 to Z50, which ranges from -270 to 140 nT. Both anomalies have the wavelength of 10-30 km. The correspondence of the ground data by JARE-17 with the obtained anomaly profile is rather good. A comparison was made of the geomagnetic anomaly profile with the previously obtained free-air gravity anomaly profile. (Auth.)

L-31598

Kaminuma, K., Abe, K., Tanaka, H., **Leveling and gravity surveys at Syowa Station, Antarctica,** *Antarctic record,* Dec. 1984 No.83, p.62-74, In Japanese with English summary. 8 refs.

Leveling surveys were carried out in East Ongul Island, according to the first order leveling survey method of Geographical Survey Institute in Japan during the winter seasons of 1979 and 1982. The accuracy of the surveys between the leveling points was better than 0.4 mm. Gravity surveys using LaCoste-Romberg gravimeter model G were also carried out in 1979 and 1982. Twenty-five gravity stations were established in West Ongul Island in 1979. The gravity at six stations out of twenty-five was also measured by JARE-19 and -22 in 1978 and/or 1981. The gravity values of the two or three independent surveys at the same station were consistent with each other within the accuracy of 0.1 mgal. Five gravity stations were also established at the geodetic control points in small islands off Langhovde, and three stations near the water tube tiltmeter of two components at Showa Station. (Auth.)

L-31600

Kaminuma, K., **Activities of Japanese earth science research in the McMurdo Sound region in the 1983-1984 season,** *Antarctic record,* Dec. 1984 No.83, p.81-87, In Japanese with English summary. 6 refs.

Japanese scientists visited McMurdo Station from November 11, 1983 to January 16, 1984 to participate in the International Mt. Erebus Seismological Studies. This was the fourth year of the cooperative project by Japan, the United States and New Zealand. The magnetic tapes which have been recorded since October 1983 were played back. The daily frequencies of volcanic earthquakes occurring in and around Mt. Erebus were counted and earthquakes were scaled. Two new telemetry seismic stations were established. Eight temporary seismic stations were established on the flank of Mt. Erebus for precise determination of the earthquake locations. One station was also established at Vanda Station for detecting local earthquakes. LaCoste-Romberg gravimeter model G was used at eight temporary seismic stations and five telemetry seismic stations. Four additional gravity stations were established on the northeast side of the summit crater of Mt. Erebus and another four stations at outcrops in the eastern part of Ross Island. (Auth.)

L-31614

Eckstaller, A., Miller, H., **Gravity tides on the Filchner Ice Shelf,** Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.58-59, 1 ref.

In an experimental pilot project, gravity and tidal relationships were observed during a traverse from Filchner Station to 78.6S 55.3W. Diurnal and semidiurnal gravity variations were measured and amplitudes were noted. These variations result mostly from ocean tides and their effect on the floating ice shelf.

L-31615

Kahnt, W., Bosum, W., **Aeromagnetic measurements of the Filchner Ice Shelf and near Georg von Neumayer Station as part of the 1983/84 Filchner Ice Shelf Project** [Aeromagnetische Messungen im Filchner Schelfeis und im Gebiet der Georg von Neumayer Station im Rahmen des Antarktiseinsatzes 1983/84 Filchner-Schelfeis-Projekt], Filchner-Ronne Ice Shelf programme, Report 2 (1985), H. Kohnen, comp, Bremerhaven, Alfred Wegener Institute for Polar Research, 1985, p.60-67, In German with English summary. 1 ref.

Airborne magnetic measurements proved the reliability and accuracy of the airborne magnetometer, installed in the Dornier aircraft Polar 2. Near Georg von Neumayer Station strong magnetic anomalies were found, which give hints to interesting geological structures. Near Filchner Station smoothed magnetic anomalies of smaller amplitudes, pointing to a deep magnetic basement, were observed. A continuation of the airborne magnetic measurements in a denser grid, especially in the area of the Georg von Neumayer Station is strongly recommended. (Auth.)

L-31711

Adams, R.D., Hughes, A.A., Zhang, B.M., **Confirmed earthquake in continental Antarctica,** *Geophysical journal,* May 1985 81(2), p.489-492, 12 refs.

An earthquake of magnitude (Mb) 4.5 has been located by the International Seismological Centre, near 81S, 37E in the continental platform of East Antarctica, about 1200 km from the coast of Dronning Maud Land, and 500 km from the Pole of Inaccessibility. The event was found by the Centre's 'search' procedure, which is undertaken with a deliberate delay of about two years. It occurred on 1982 November 4, and its position is well determined from five stations in Antarctica, and four farther afield. This is the first earthquake definitely located in the interior of the antarctic continent, although there have been some earlier less well established claims, and other earthquakes have occurred near the coast, or associated with areas of volcanism or ice movement. (Auth.)

See also:
A-31031 C-30646 C-30803 E-29111 E-29120 E-29410 E-29453
E-29533 E-29561 E-29619 E-29828 E-29865 E-29867 E-30235
E-30236 E-30240 E-30915 E-30916 E-31012 E-31020 E-31395
E-31473 F-29112 F-29894 F-30099 F-30101 F-30102 F-30910
G-31245 I-29296 J-31719 K-29430 K-29431 K-31326

M. POLITICAL GEOGRAPHY

M-29145

What to do about Antarctica, *Nature,* Feb. 23, 1983 301(590117), p.551-552.

Comments on Special Consultative Meeting of Antarctic Treaty members at Wellington, New Zealand, February 1983, regarding the future of antarctic mineral resources are presented. It is pointed out that the definition of the circumstances under which the mineral resources might be exploited represents a problem not likely to be solved easily in spite of the friendly relationship between the treaty members. The future of the treaty, lessons to learn and risks to avoid are discussed. A danger is seen in the notion that more money should be spent on research in order to assure a visible presence, and it is suggested that a mechanism be found whereby quality of research would be rewarded rather than mere expenditure.

M-29149

Sarma, V., **Treaty goes to wider forum,** *Nature,* Nov. 1983 305(5937), p.753.

It is reported that the future of the Antarctic Treaty will be debated by the United Nations General Assembly, most probably toward the end of November, 1983, due to the issue raised about its alleged exclusiveness, and that most likely the secretary-general will be asked to carry out an investigation and report back next year.

M-29177

Joyner, C.C., **Antarctica and the law of the sea: an introductory overview,** *Ocean development and international law journal,* 1983 13(3), p.277-289, Numerous refs.

This article examines the potential for conflict between the Antarctic Treaty regime and the Convention recently produced by the Third United Nations Conference on the Law of the Sea. Should the UNCLOS III Convention enter into force, at least six issue-areas seem susceptible to future controversy in Antarctic waters, namely (1) seaward territorial limits; (2) resource management and conservation; (3) local environment protection; (4) marine scientific research; (5) deep seabed mining; and (6) archipelagic-island regimes. Accordingly, each issue-area is assessed as to its relevance for the Southern Ocean vis-à-vis the Antarctic Treaty parties, with a particular view towards signaling possible problems which involve conflict of interest and overlapping jurisdiction. (Auth.)

M-29178

Frank, R.F., **Convention on the Conservation of Marine Living Resources,** *Ocean development and international law journal,* 1983 13(3), p.291-345, Numerous refs.

The Convention purports to regulate national involvement in the Southern Ocean by managing the exploitation of all life in the nearly pristine Antarctic marine ecosystem. Krill and various species of fish have been harvested in the Southern Ocean for more than a decade, but at levels far below those that nearly led to the extinction of Antarctic whales and seals. The promise of this conservation Convention is to allow a stable level of harvesting of all species for the foreseeable future. If ratified, the Convention would create a supervisory Conservation Commission and an advisory Scientific Committee to monitor the extent and impact of harvesting activities, to coordinate the collection of information, and to restrict the species, areas, and levels of exploitation, thus preserving the integrity of the ecosystem. However, in order to accommodate political and economic national interests, the language of the Convention opens several loopholes in the key areas of voting, data collection, and non-party participation. Further, based as it is upon the Antarctic Treaty, the Convention seeks to perpetuate the strengths and weaknesses of the Treaty regime, particularly by maintaining the status quo regarding Antarctic territorial claims. Despite its flaws, the Convention seems to be a rational and timely compromise of competing national interests. It thus should serve as a model not only for the forthcoming Mineral Resources Convention, but also as a continuing symbol of the spirit of peaceful cooperation characterizing the Antarctic region. (Auth.)

M-29179

Boczek, B.A., **Protection of the antarctic ecosystem: a study in international environmental law,** *Ocean development and international law journal,* 1983 13(3), p.347-425, Numerous refs.

The legal status of Antarctica is largely determined by the 1959 Antarctic Treaty, and especially by the inner circle of the currently fourteen "consultative" status signatories. These states have given high priority to ecological considerations by enacting a series of environmental and conservationist regulations, as well as two conventions, one protecting the Antarctic seals and the other marine living resources in general. Environmental regulations will form an important part of the legal regime for the exploration and exploitation of the Antarctic mineral resources, primarily oil and gas. The Antarctic Treaty framework does not legally bind nonsignatory states, but under general international law all states are bound to refrain from inflicting damage upon the planet's environment. Also, some marine pollution conventions apply to the Antarctic waters, and the 1982 U.N. Convention on the Law of the Sea comprehensively covers the protection and preservation of the marine environment of all oceans and seas. The preservation of the Antarctic environment will remain a high priority irrespective of what legal regime will govern Antarctica after 1991 when the Antarctic Treaty may, and most probably will, be subject to review. (Auth.)

M-29248

Beck, P.J., **Science—and politics—on ice; India in Antarctica,** *Nature,* Nov. 1983 306(5939), p.106-107.

During India's first antarctic expedition—Dec. 1981 to Feb. 1982—an unmanned solar-powered station was established at 70 deg 45 min S 11 deg 38 min E to provide India with meteorological information. The second expedition followed and a third is planned. India's recent application for consultative party status in the Antarctic Treaty system, and the scientific, political and economic implications that go with it, are discussed.

M-29259

Westermeyer, W.E., **Politics of mineral resource development in Antarctica. Alternative regimes for the future,** Boulder, Westview Press, 1984, 267p., Refs. p.193-205.

This book examines the international legal issues surrounding future exploitation of resources in the Antarctic. Following an analysis of the Antarctic Treaty, twelve proposals viewed as most likely alternatives for a new international regime for the antarctic region are discussed. Employing a method known as multi-attribute utility analysis, each alternative is evaluated in terms of the relevant interests of the fourteen nations involved in order to determine which of the proposals best serves collective interests. Also addressed are such issues as the criteria for the nature of participation in an antarctic minerals regime, potential conflict among various development objectives, and the balance between environmental and developmental concerns.

M-29285

Scully, R.T., **Management in Antarctic Treaty activities,** *Sea technology,* Jan. 1983 24(1), p.40-41.

The author reviews significant events affecting Antarctica in 1982 and projects the level of U.S. activities there in 1983. He cites three important events: the coming into force in April 1982 of the Convention on the Conservation of Antarctic Marine Living Resources; the Special Consultative Meeting on Antarctic Minerals in Wellington in June during which the 14 Antarctic Treaty Consultative Parties began the process of defining an antarctic minerals regime; and the Presidential directive to maintain programs to support an active and influential U.S. role in Antarctica.

M-29293

Deporov, IU., **Antarctica: a zone of peace and cooperation** [Antarktika—zona mira i sotrudnichestva], *Mezhdunarodnaia zhizn',* Oct. 1983 No.10, p.37-46, In Russian.

The geographical position of Antarctica is reviewed in terms of the role it plays in international communication and research. Territorial claims of the different nations with research stations in Antarctica are discussed. The articles of the Antarctic Treaty are reviewed, with special emphasis on those providing protection against nuclear waste and nuclear armament, as well as those dealing with conservation and rational exploitation of antarctic living and mineral resources. The Soviet Union endorses the Antarctic Treaty as one of the most important legal international documents of modern times, created for the support of peace and the eradication of danger not only in the Southern Hemisphere but on the entire planet.

M-29363

Larus, J., **India claims a role in Antarctica,** *Round table,* 1984 Vol.289, p.45-56, Refs.

The three phases of Operation Gangotri, the 1981 and 1982 Indian expeditions to Antarctica, are described. The Antarctic Treaty is reviewed, and the policies India supports as the newest member of the Consultative Parties group—that Antarctica be declared the common heritage of mankind, with resources available to all nations—are pointed out as crucial to the Third World states, in their collective quest for a better distribution of the world's resources.

M-29470

Maddox, J., **Antarctic mining regime at risk,** *Nature,* Jan. 1984 307(5947), p.105-106.

A short history of the Antarctic Treaty is presented, and the central issues on which critics from various governments have focused are reviewed. Some solutions to the problem concerning territorial claims are offered.

M-29492

U.S. Department of State, U.S. Arms Control and Disarmament Agency, **Report of the United States Antarctic inspection,** [Washington, D.C., 1975-1983], 4 reports, Unpublished manuscripts. Title varies. For inspection reports for 1961, 1967, and 1975 see 2M-2917, 3M-5594, and 7M-12807, respectively.

Under the terms of the Antarctic Treaty, each consulting party has the authority to inspect the stations of other consulting parties for compliance with the Treaty as regards the bans on military activity, nuclear explosions and waste disposal, and armaments in Antarctica. These four reports describe the results of inspections made by U.S. representatives during the years 1975, 1977, 1980, and 1983. Activities and facilities at each station visited are described in greater or lesser detail, including the scientific programs and equipment. In all reports each station was judged to be in compliance with the spirit and the letter of the Antarctic Treaty provisions cited.

M-29672

Da Gama Pinto, C., **Battle for the treasures of the last frontier on earth,** *South,* Dec. 1983 No.38, p.38-39.

The Antarctic Treaty is discussed from the point of view of the Third World, which is that the treaty nations do not have a mandate to negotiate a minerals regime and do not represent the whole international community. A map marking the location of stations of the signatory nations, as well as possible mineral deposits, oil, natural gas and coal, is included.

M-29701

Treude, E., **Polar regions; political-legal problems of their exploration and exploitation** [Die Polargebiete; politisch-rechtliche Probleme ihrer Erschliessung und Nutzung], *Geographische Rundschau,* Mar. 1983 35(3), p.126-132, In German. 19 refs.

A brief review is given of polar international politics as it currently stands. It includes a comparison of regional claims and legal situations in the Antarctic and the Arctic. Pertinent Antarctic Treaty provisions and regional conventions among the Treaty consultative parties are discussed.

M-29707

Kimball, L., **Antarctica: summary and comment on background and recent developments,** Washington, D.C., International Institute for Environment and Development, 1984, 8p., Manuscript report.

A brief account is given of the establishment and effectiveness of the Antarctic Treaty and some of the accomplishments achieved under its provisions. In recent years criticisms have been made by nations not consultative parties to the Antarctic Treaty that the ATCP were administering Antarctica not in the best interests of the world community but in their own interests especially as regards mineral resources potentially there. ATCP spokesmen responded to these criticisms and these responses are summarized here.

M-29819

Mitchell, B., **Antarctica—the unanswered question,** *International Union for Conservation of Nature and Natural Resources. ICUN Bulletin,* Jan./Mar. 1984 N.S.15(1-3), p.9-10.

An overview is given of thoughts expressed by various representatives to the UN during the opening of discussions on the Antarctic. The UN Secretary-General has been charged to make a comprehensive, factual study of all aspects of Antarctica, taking fully into account the Antarctic Treaty system and other relevant factors. He will present a report of his findings in Nov. 1984. A review is presented of the accomplishments of the Treaty parties in Antarctica, especially with regard to the conservation of the marine living resources and current activities on the management of potential mineral resrources. ICUN near-term conservation plans for Antarctica are outlined.

M-29838

Beeby, C., **Towards an Antarctic mineral resources regime,** *New Zealand international review,* May/June 1982 7(3), p.4-6.

Antarctic mineral and marine living resources, and their current and future exploitation, are discussed. The need for a minerals regime and environmental protection is pointed out, and a set of principles upon which the future resources regime should be based is outlined.

M-29841

Barber, L., **Keeping New Zealand's back door closed,** *New Zealand international review,* May/June 1982 7(3), p.13-14.

It is pointed out that in the next century Antarctica will most probably be highly placed as a strategically important geopolitical zone.

M-29842

Shapley, D., **Arctic, Antarctic: a polarization of interest,** *Sea power,* Apr. 1983 26(5), p.104-105.

Recent events in the growing maritime activity in the Antarctic, by many nations, particularly those involved in krill fishing and marine geophysical research, are reviewed.

M-29898

Gajardo V., E., **Chile, the Antarctic Treaty and its system** [Chile, el Tratado Antártico y su sistema], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1983 3(2), p.7-15, In Spanish.

The origin, history and principles of the Antarctic Treaty are discussed, and the decisions and recommendations concerning it, resulting from the first Consultative Meeting, held in Canberra in 1961, through the 12th Consultative Meeting in 1983, are described.

M-29917

Norway in the Antarctic, *News of Norway,* May 18, 1984 41(7), p.39-41.

Norwegian interests in Antarctica are traced to whaling expeditions in 1892 and the first landing on the Continent in 1895. Situations and events leading to the annexation by Norway of Bouvet Island, Peter I's Island and Queen Maud Land are discussed. With a break during WW II, Norway has been active in scientific research programs there since 1929-1930. The Antarctic Treaty is discussed, the question of exploiting natural resources is outlined, and Norwegian views are presented regarding the functioning of the Treaty, territorial claims, and international cooperation.

M-29925

Jung, E.F., **Antarctica in world affairs,** *Aussenpolitik,* 1984 35(1), p.80-86.

Following a brief outline of physical Antarctica, its exploration history and commodity potential, the existing Antarctic Treaty system is reviewed. Some basic provisions are stated and the extent to which the Treaty is binding on nations not a party to it are discussed. Legal aspects are examined of how well the Treaty meets the requirements for international acceptance, i.e., open access, settlements for the common good, and effectivity. Potential conflicts are outlined: the strategic military value of Antarctica; territorial claims; mineral resources; and the clash between the consultative states and the international community vis à vis the "common heritage of mankind" concept. Comments of possible future trends of this political debate are offered.

M-29953

Fedorov, S.G., Malyshev, A.A., **Antarctic Treaty and problems of international control of exploitation of the living resources of the southern ocean,** Antarctic krill—biology, ecology, and distribution. Edited by T.G. Liubimova, New Delhi, Amerind Publishing Co., 1984, p.217-230, TT 82-00-100, 17 refs. For Russian original see 12M-25314.

International investigation of living resources of the southern ocean and steps taken by signatories of the Antarctic Treaty are discussed. The main principles of the conservation regime to be worked out within the framework of the Treaty are reviewed and the development of international juridical acts pertaining to the utilization of natural resources of the southern ocean is analyzed. Activities of various international organizations sponsoring research and exploitation of biological resources are considered. The important role of the Soviet fishery science in the exploration of the southern ocean under the complex international research-technical policy on further development of the area covered by the Antarctic Treaty is emphasized.

M-30031

Wijkman, P.M., **Managing the global commons,** *International organization,* Summer 1982 36(3), p.511-536, Numerous footnotes and references.

DLC JX1901.I55

Natural resources over which no single nation or decision-making unit has a generally recognized exclusive jurisdiction are discussed, as are the fundamental policy issues associated with managing communal resources. The weaknesses of the Antarctic Treaty concerning comprehensive management of the Antarctic's living resources are pointed out.

M-30048

Charney, J.I., ed, **New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica,** Totowa, NJ, Allanheld, Osmun & Co., 1982, 343p., Refs. and notes passim. For selected papers see A-30049, A-30050 and M-30051 through M-30053.

The nine chapters in this book are detailed studies of specific aspects of current and potential uses of two major uninhabited areas of the globe: the oceans and Antarctica. Chapters one through four discuss the question of marine pollution. Chapters five through nine discuss the legal, political, economic, environmental, and scientific aspects of the development of the resources of Antarctica. Seven appendixes cover antarctic scientific bases, stations and claims, the Antarctic Treaty of 1959, and reports of consultative meetings, conventions and recommendations concerning the conservation, and exploitation, of antarctic mineral and marine living resources.

M-30051

Bilder, R.B., **Present legal and political situation in Antarctica,** New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica. Edited by J.I. Charney, Totowa, NJ, Allanheld, Osmun & Co., 1982, p.167-205, 29 notes and refs.

Legal and political considerations relevant to fashioning a regime capable of protecting the antarctic environment from harm from mineral exploration and exploitation are examined. The discussion covers three areas: the broad historical and legal context of present national activities in Antarctica, the present legal situation regarding ownership and jurisdiction with respect to antarctic resources, and the present legal situation regarding protection of the antarctic environment.

M-30052

Charney, J.I., **Future strategies for an antarctic mineral resource regime: can the environment be protected,** New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica. Edited by J.I. Charney, Totowa, NJ, Allanheld, Osmun & Co., 1982, p.206-238, 90 notes and refs.

The alternative regimes that might be considered for antarctic mineral development are explored. This analysis proceeds in four steps: cataloging of interests that might influence the actions of participating nations; considering the feasibility of seeking the protection of one interest to the exclusion of all others, or whether to compromise; identifying procedures necessary for the protection of the environment so that the potential legal regimes can be evaluated; and reviewing alternative strategies in order to evaluate their feasibility and acceptability.

M-30053

Barnes, J.N., **Emerging Convention on the conservation of antarctic marine living resources: an attempt to meet the new realities of resource exploitation in the southern ocean,** New nationalism and the use of common spaces: issues in marine pollution and the exploitation of Antarctica. Edited by J.I. Charney, Totowa, NJ, Allanheld, Osmun & Co., 1982, p.239-286, 125 notes and refs.

Negotiations to develop a new international convention on exploitation and conservation of marine life in the ocean surrounding Antarctica are reviewed, and the impact of the Convention on the related international situation is discussed. It is concluded that the Marine Living Resources Convention which the Antarctic Treaty Consultative Parties have produced is a limited-purpose effort that leaves resolution of the critical juridical issues to the future, and that creates serious problems from the standpoint of sound environmental controls and decisions.

M-30186

Beck, P.J., **United Nations and Antarctica,** *Polar record,* May 1984 22(137), p.137-144, 32 refs.

The United Nations as a body has hitherto shown little interest or involvement in Antarctica. A recently developed campaign, led by several of the developing nations, now aims to involve the international community more closely in the management of the continent and its resources. Argument that Antarctica should be regarded as part of the common heritage of mankind finds little support among Antarctic Treaty nations, who favour continuing management under the treaty system. A nine-hour discussion in the First Committee of the United Nations General Assembly during November 1983 resulted in a resolution on "the question of Antarctica" which the General Assembly adopted unanimously on 15 December; the Secretary-General has been asked to report on "all aspects of Antarctica" in time for further discussion in September 1984. (Auth.)

M-30196

De Castro, T., **Antarctica: the sixth part of the world** [Antártica: a sexta parte do mundo], *Atlas de relações internacionais,* [1971] No.20, Caderno especial da Revista brasileira de geografia, Vol.33, No.4, p.2-12, In Portuguese.

After a review of the geographic, economic and geological aspects of Antarctica, the sovereignty rights to the continent based on priorities of discovery and geographic proximity, are discussed. It is argued that discovery rights claimed by the signatory nations of the Antarctic Treaty are of a later date than those of Portugal. In addition, Brazil bases its claim on the right of polar partition which is illustrated by a map showing Antarctica divided into sectors representing geographic portions assigned to different nations. Each sector is a spherical triangle with its apex at the South Pole, its sides limited by meridians, and its base at the equatorial line. The Brazilian sector claimed is enclosed within the meridians Arroio Chui (55 W) and Martim Vaz (15 W).

M-30213

Heimsoeth, H., **Antarctic mineral resources,** *Environmental policy and law,* Nov. 1983 11(3), p.59-61.

An interdisciplinary symposium, organized by the Institute for International Law of the University of Kiel, West Germany, in June 1983, is reported. The ensuing Special Consultative Meeting on Antarctic Mineral Resources, held in Bonn for government representatives of the 14 consultative parties of the Antarctic Treaty and their advisers, is reviewed. Preservation and protection of the antarctic environment are discussed, and legal issues are examined in the light of exploration and exploitation possibilities of the mineral resources and in agreement with the articles of the Treaty. Points in favor of the territorial claims of the consultative states are made against the argument favoring an international regime for Antarctica advanced by the nonaligned nations.

M-30216

Golitsyn, V.V., **International law regime for Antarctica** [Antarktika: mezhdunarodno-pravovoĭ rezhim], Moscow, Mezhdunarodnye otnosheniia, 1983, 160p., In Russian. Notes and refs. p.152-158.

In the first chapter of this book, the geography of Antarctica, the history of its discovery, the growing interst in its resources, and the development of international cooperation in scientific research based on the articles of the Antarctic Treaty, are reviewed. The values of the Treaty, its applicability as a guiding example, are discussed in greater detail in chapters two and three, where the principles of international law governing territorial claims, the peaceful exploration—and rational exploitation—of antarctic living and mineral resources, and the right to free research, are extolled. Extensive literature, supportive of an antarctic regime based on international law, is reviewed.

M-30381

McKenzie, G., **National security and the Austral Crescent,** *Ohio. State University. Mershon Center. Quarterly report,* Spring 1984 8(4), 8p., 23 refs.

International interest in Antarctica is reviewed from a historical, political and economical point of view. In discussing the political role of the United States, the role of a peacemaker, the losses foreseen if the United States pulled out of Antarctica are as follows: the scientific resources of the continent; the potential mineral resources; the stabilizing role of the two major world powers; transportation capabilities and cold climate experience would be affected by the loss of American stations in Antarctica; the international good will of cooperative ventures. In addition, it is suggested that the military potential of the continent might be realized by others if the United states pulled out of the Treaty and the continent. The name Austral Crescent is explained: it covers an area encompassing all of West Antarctica and a little of East Antarctica, and the ocean portions connecting it to urban areas in the Southern Hemisphere. Its significance is outlined in terms of scientific, political, resource and transportation factors.

M-30430

Antarctica and New Zealand, *New Zealand. Ministry of Foreign Affairs. Information bulletin,* Aug. 1984 No.8, 48p.

The United Nations General Assembly in December 1983 adopted a consensus resolution requesting the Secretary-General to prepare a comprehensive, factual and objective study on all aspects of Antarctica, taking fully into account the Antarctic Treaty system and other relevant factors. It also requested the Secretary-General to seek the views of all member States in the preparation of the study. This Information Bulletin contains New Zealand's comments submitted in accordance with that request. Following remarks on the physical setting and exploration of Antarctica, and New Zealand sovereignty in the Ross Dependency, the comments develop New Zealand's views on the Antarctic Treaty with emphasis on scientific research and protection of the antarctic environment. Comments are also made on antarctic natural resources both living and mineral. Regarding an antarctic minerals regime, New Zealand strongly supports Recommendation XI-1 adopted at the Eleventh Consultative Meeting in 1981. This recommendation established the basic framework for the minerals regime and provided for, among others, maintaining the Antarctic Treaty in its entirety; protecting the antarctic environment;

protecting the interests of all mankind. Texts of primary agreements for the governing of Antarctica are included.

M-30439

Kiel. Universität. Institut für Internationales Recht, Wolfrum, R., ed, Bockslaff, K., ed, **Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development,** Veröffentlichungen des instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, 253p., Proceedings of an interdisciplinary symposium, June 1983. Refs passim. For individual papers see A-30441, A-30445, B-30443, B-30444, E-30447, E-30448, M-30440, M-30442 and M-30446.

Sixty participants gathered from 14 countries including Argentina, Australia, Brazil, Chile, Denmark, Federal Republic of Germany, India, New Zealand, Norway, South Africa, Sri Lanka, United Kingdom, United States, and Uruguay. They met to exchange views on the status of Antarctica when territorial claims are juxtaposed with a minerals regime for the recovery of natural resources. The emphasis is on legal and political aspects but with discussions also on economic and environmental concerns. The viability of the Antarctic Treaty System is considered in relation to existing international law and the UN Convention on the Law of the Sea III (UNCLOS III). Texts of the Convention on the Conservation of Antarctic Marine Living Resources and recommendations IX-1 and XI-1 approved at Consultative Parties meetings are appended.

M-30440

Sollie, F., Heap, J., **Development of the Antarctic Treaty System—trends and issues,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.17-37, Comment by J. Heap, p.38-40.

Basic principles of the Treaty are pointed out: Antarctica to be used only for peaceful purposes, mainly in scientific research; military activities and nuclear explosions are banned; a free exchange of views; open inspections of all antarctic facilities; sovereignty or non-sovereignty claims are set aside, neither viewpoint being pushed. The evolution of the Treaty is shown through recommendations of the Treaty parties at consultative meetings. Pros and cons of the exclusivity of the Treaty parties are discussed. The concept of a scientific research effort free of politics is set forth as the key to the success of the Treaty System in conjunction with the requirement for full consensus with each provision of the Treaty and the Treaty as a whole. This concept is reinforced as the same consensus is required for the adoption of recommendations at consultative party meetings. Lengthy negotiating periods for complex issues and a tendency to avoid controversial issues are cited as the most serious weaknesses of the Treaty System. In his comments, Heap regards successes achieved through the Treaty System as being due to resolving problems before they become problems and the dedication and commitment of the parties to the idea of international cooperation without pushing the burr of territorial claims to a logical conclusion.

M-30442

Rauschning, D., **Discussion [on the impact of utilizing antarctic minerals on the Antarctic Treaty],** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.57-66.

A general exchange of views addressed the question posed by Rauschning: How will the problem of using the mineral resources of Antarctica be resolved within the Treaty System without producing conflict between territorial claimants and non-claimants? Responding were Sollie, Heap, Guyer, Pinto, Barnes, and Wyndham. All agreed that the territorial claims issue is difficult but more a legal problem than a practical one. Sollie points out that Treaty nations in consensus have agreed as a fundamental principle, to recognize each other's viewpoint as regards territorial claims as long as the Treaty is in force. Wyndham believes that the two greatest achievements of the Treaty System have been the non-militarization and nonnuclearization of Antarctica. He says these have been achieved because a lot of people were determined that these things should be achieved and worked long and diligently to that end.

M-30444

Lagoni, R., **Convention on the Conservation of Marine Living Resources: a model for the use of a common good,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.93-108, Comments and discussion p.109-131.

The history of the Convention is reviewed from the recommendation made in 1977 through its development to its coming into force in 1982. Major concerns leading to the adoption of the Convention were: the threat to krill; that Antarctica might become the scene of international discord; and that outside influences, unknowing or uncaring about Antarctica's uniqueness, might intrude to develop legal rules and principles for marine living resources. The Convention embodies a landmark in the development of international law for the conservation of living resources by using an ecosystem approach through which the Convention applies to the region south of the Antarctic Convergence rather than using the Antarctic Treaty boundary of 60S. The Convention seeks to establish three major principles: prevent the decrease in size of any harvested population below that by which it can sustain itself; maintain ecological relationships between harvested, dependent, and related populations; and prevent irreversible changes in the ecosystem. All of these aspects of the Convention are discussed and comments and additional discussions are provided by Illing, Wyndham, Delbrück, Partsch, Dolzer, Pinto, Hempel, Rauschning, Barnes, Heap, Sahrhage, and the author.

M-30446

Wolfrum, R., **Use of antarctic non-living resources: the search for a trustee,** Antarctic challenge: conflicting interests, cooperation, environmental protection, economic development, edited by R. Wolfrum and K. Bockslaff. Veröffentlichungen des Instituts für Internationales Recht an der Universität Kiel, No.88, Berlin, Duncker und Humblot, 1984, p.143-163, Numerous refs. Comments and discussions p.164-188.

The topic is introduced by pointing out various models commonly cited when discussing the issue of using antarctic mineral resources: national solution, condominium, trusteeship, and common heritage. An alternative is presented based on the assumption that the Antarctic Treaty will serve as an umbrella for a future mineral resources regime, a supplementing, not competing regime. The presentation discusses various aspects and elements comprising the impact the Antarctic Treaty will have on such a regime; outlines a regime which attempts to accommodate the interests of the Consultative Parties; projects the conditions under which the new regime will have to be accepted by third states. These topics are explored in some detail and portions of them are commented on by Pinto who makes a presentation opposing the exclusivity of the Consultative Parties on antarctic affairs. Comment on the Impact of UNCLOS III on the antarctic regime is given by Miller and discussions are given by Jung, Croharé, Barnes, Reidel, Wyndham, Delbrück, Partsch, Sollie, Hempel, and Wolfrum.

M-30473

Anderson, A., **Minnows smell a rat,** *Nature,* June 7, 1984 309(5968), p.489.

A report and assessment is given of the outcome of the Antarctic Treaty Consultative Parties meeting in Tokyo in May 1984. The ATCP met to continue the process of developing a minerals regime for Antarctica.

M-30547

Joyner, C.C., **Oceanic pollution and the southern ocean: rethinking the international legal implications for Antarctica,** *Natural resources journal,* Jan. 1984 Vol.24, p.1-40, Numerous refs.

Two basic concepts are juxtaposed: the perceived need to recover and use antarctic natural resources and the need to prevent degradation to the environment and habitat in which the natural resources are found. Vessel and land-based sources for polluting antarctic waters are identified and discussed: the antarctic environment is described and efforts thus far made to conserve that environment are pointed out. Fundamental principles and mechanisms of the Antarctic Treaty and of the Convention for the Conservation of Antarctic Marine Living Resources are stated and the strengths and weaknesses of both documents are argued. Although no international regime now formally exists to protect, preserve and conserve Antarctica's marine environment, several possible courses which seem available to accomplish these ends are examined. Possibilities for conflicts in the Draft Convention of UNCLOS III and their impact on Antarctica are considered and an assessment is given.

M-30579

McKenzie, G.D., **Geopolitical and scientific roles of the United States in Antarctica,** Columbus, Ohio State University, Oct. 1983, 59p., Refs. p.54-59. Unpublished manuscript.

To understand the science and politics of Antarctica, one must be familiar with the background of the region. To provide this, a brief introduction is given to the physical setting, including the geography, physical features, geology, and climate. Next is a brief history of exploration, to show U.S. involvement and the development of commercial and scientific interests. Then, to set the stage for further discussions, the Antarctic Treaty and the groups currently interested in Antarctica are reviewed. Central to understanding our scientific and geopolitical roles is the resource situation. Resources remain the key to the future of Antarctica. Commercial gain, governed by national interest, now is the factor drawing other nations to Antarctica. Also, it is causing some treaty nations to reevaluate their research programs there. Resources are defined in the widest possible terms in this paper and include the obvious such as mineral resources to the less obvious such as scenic and scientific resources. Throughout the paper the importance is shown of all aspects of the Antarctic question to the United States and indirectly to national security. In the final chapter of the paper the focus is more on the national security aspects of emerging issues, and miniscenarios are presented that might develop if the U.S. were not present in Antarctica. The concept of the Austral Crescent, which is based mainly upon geographical and geological considerations that have an impact on the geopolitical approaches to the area is also presented. (Auth. mod.)

M-30667

Auburn, F.M., **Legal implications of petroleum resources of the Antarctic Continental Shelf,** Chicago, University of Chicago Press, 1978, p.500-515, Ocean yearbook 1, edited by E.M. Borgese and N. Ginsberg. Numerous refs.

The emergence of antarctic petroleum resources as a political problem is reviewed. Touched upon as germane to the issue are: the severe antarctic weather; excessive distance to oil and gas markets; lack of technology for drilling in the antarctic environment; lack of solid evidence of commercially viable quantities of petroleum; national territorial claims; deleterious effects of oil spills; protection of offshore drilling rigs from icebergs; the Antarctic Treaty; and pollution of ice and sea water by wastes from drilling operations.

M-30668

Mitchell, B., **Southern ocean in the 1980s,** Chicago, University of Chicago Press, 1982, p.349-385, Ocean yearbook 3, edited by E.M. Borgese and N. Ginsberg. Numerous refs.

A review is given of antarctic natural resources and the interest they will command. An assessment is made of the environmental impact of resource recovery in the southern ocean. The third section examines current attempts to establish resource-management arrangements under the auspices of the Antarctic Treaty. The final section is devoted to the attitudes and aspirations of those countries which have not signed the 1959 treaty. (Auth.)

M-30814

Luard, E., **Who owns the Antarctic,** *Foreign affairs,* Summer 1984 62(5), p.1175-1193, 1 ref.

The author provides as background a brief history of territorial claims made in Antarctica; the development of the Antarctic Treaty; the convention on living resources; and the emergence of non-living resources as a new source of international dispute. A set of conditions is laid out for the governance of the Antarctic and three broad measures are suggested as means for fulfilling these conditions. The system must provide for: continuing the existing demilitarized status in Antarctica; its regional use as base for scientific research; open access for legitimate purposes; above all, a stable system. The suggested measures include: a Treaty based regime; a wholly new regime; a regime which retains the Treaty for current purposes and establishes a separate resources management regime. Pros and cons of these possible solutions to a sticky question are discussed.

M-30823

Beck, P.J., **Antarctica: a case for the UN?,** *World today,* Apr. 1984 40(4), p.165-172.

Past and present disputes over territorial claims and natural resource exploitation in Antarctica are reviewed. The challenge posed to the Consultative Parties by non-member governments, to create a UN-based alternative to the Antarctic Treaty system, is discussed.

M-30995

Price, R.L., Vaucher, M.E., **Prospective maritime jurisdictions in the Polar seas,** *Association of American Geographers. Annals,* Dec. 1983 73(4), p.617-618 + 2 maps, 6 refs.

The maps illustrate the possible extent of the 200-nautical-mile exclusive economic zone in the polar regions. They also show the 500 m and 2,500 m isobaths as they relate to prospective economic zones. Equidistance lines are shown between countries, and where negotiated maritime boundaries exist these too are shown. The maps and accompanying text indicate where disputes may eventually arise over maritime jurisdictions as nations begin claiming sovereignty over offshore areas. (Auth.)

M-31025

Roberts, N.S., **New Zealand interests in Antarctica,** *New Zealand international review,* Sep./Oct. 1983 8(5), p.6-12, Numerous refs. Revised version of a paper given at a NZIIA Antarctic Seminar.

The author examines the many facets of New Zealand's national interests and how they have altered over the years as concepts change of what national interests means. Development is traced of New Zealand's relationships with Antarctica and the strategic significance of the Antarctic Treaty to New Zealand is pointed out. Other relationships between the small country and the large cold continent are analyzed: American assistance, New Zealand's maritime capability, economic well-being, the meteorological program, mineral resources, political interests, territorial claims, making independent decisions, and promotion of national values. A conclusion is reached that New Zealand policy is following a middle path between "Think Big" and "Small is Beautiful."

M-31026

Laking, G., Shearer, I.J., Beeby, C., Hatherton, T., Hopper, W.C., Machin, A., **Antarctic perspectives,** *New Zealand international review,* Sep./Oct. 1983 8(5), p.13-19, 1 ref. Excerpts from papers given at a NZIIA Antarctic Seminar.

Excerpts of papers by different authors are presented. Laking expounds on New Zealand's expanding relationship with its Pacific neighbors, environmental issues, trade, Antarctica and its resources. He favors a long view in which diplomacy is the catalyst for maintaining strong international cooperation. Shearer emphasizes that to protect the antarctic environment is a prime goal of a minerals regime; protection of reasonable benefits for New Zealand and international acceptance of the regime are also sought. Beeby urges the development of a minerals regime within the Antarctic Treaty system and that consideration be given to sovereign claims and the interests of the international community as a whole. Hatherton stresses the logistics aspects and New Zealand's need for a supply vessel. Hopper's primary aim is environmental protection; New Zealand's most pressing needs are support of its antarctic programs independent of U.S. assistance, and, to do this, an ice-strengthened supply ship. Machin states that the main theme underlying all interests in Antarctica is resource politics: by their interest in resources the Antarctic Treaty nations are unnecessarily stressing the Treaty. Environmentalists profess to have the panacea for antarctic problems: declare Antarctica to be a world park. With no support for this concept among the Treaty nations, they are taking the case to the United Nations.

M-31062

United Nations. Secretary-General, **Question of Antarctica: Study of the Secretary-General,** *United Nations document,* Sep. 1984 A/39/583 (Parts I and II), 4 pieces.

At the 38th Session of the UNGA, resolution 38/77 Dec. 15, 1983 requested the Secretary-General to prepare a comprehensive factual study on all aspects of Antarctica. Part I of the study is a composite of responses from about 50 member nations indicating their concerns regarding Antarctica and the Antarctic Treaty; deliberations on Antarctica at the 38th Session of the UNGA; the Antarctic Treaty System in practice; and scientific research and natural resources in Antarctica. Part II, consisting of three volumes, contains the responses of 54 nations.

M-31098

Hayes, A.C., **Antarctica—challenge for the 1990s,** Newport, Naval War College, June 22, 1984, 33p., ADA-143 824, Student research paper. Notes and refs. p.27-32.

This paper looks at Antarctica from a strategic perspective, asking what the significance of the continent might be. Several areas are explored, ranging from military control of the Drake Passage, to resource exploitation, as possible challenges for the 1990s. A review of antarctic literature concludes that little work has been done in specifically establishing what the strategic concerns for the U.S. might be and consequently a warning intelligence matrix is lacking. A tentative definition of the threat in three forms is presented, along with a list of possible indicators which would guide collection, focus analysis, and support judgments relevant to developing threats. (Auth.)

M-31247

Ferrero, A.A., **Antarctica: a strategic goal** [La Antártida como fin de una estrategia], *Antártida,* Feb. 1984 No.13, p.18-27, 30, In Spanish.

The article expresses an Argentine view of historical events leading to international interest in the Antarctic over the years, which ultimately led to the signing of the Antarctic Treaty. The existing treaty is denounced and an appeal is made to modify it in 1991. Diagrams showing portions of Antarctica claimed by different nations, the distribution of stations, areas of krill concentration in the antarctic waters, etc., are presented to illustrate the necessity of reviewing the Treaty.

M-31344

Orrego Vicuña, F., ed, Infante Caffi, M.T., ed, Armanet Armanet, P., ed, **Chile's antarctic policy** [Política antártica de Chile], Santiago de Chile, Universidad de Chile, 1984, 307p., Refs. passim. For individual papers see B-31357, G-31355, -31356, M-31345 through 31354 and M-31358 through -31364.

Chile's current antarctic policy and historical orientations, from the points of view of geography, science and technology, conservation of the environment, antarctic mineral and living resources, law, international cooperation, and administration, are discussed in this collection of 20 articles from a working group on Chile's antarctic policy and a seminar on the same subject held in the Instituto de Estudios Internacionales of the University of Chile in December, 1983.

M-31345

Orrego Vicuña, F., **Chile's extracontinental projection** [La proyección extracontinental de Chile], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.15-34, In Spanish.

An interpretation of the maritime, antarctic and Pacific policies of Chile is presented in the light of that country's isolated geographic position. The law of the sea is broadly reviewed in its past and present application to Chile's rights of navigation, commerce, communication, and expansion in general, and into the Antarctic in particular.

M-31346

Romero J., P., **Chile's presence in the Antarctic** [Presencia de Chile en la Antártica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.35-50, In Spanish.

Chile's rights in Antarctica are reviewed in the light of historical events, such as the signing of various treaties from the Tratado de Tordesillas in 1494 to the Antarctic Treaty in 1961, the installation of Chilean bases in Antarctica, Chile's antarctic activities of several decades, and its participation in international research programs in the Antarctic.

M-31347

Toro Alvarez, C. de, **Historical tie between the continental territory and Antarctica** [Vinculación histórica del territorio continental y la Antártica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.51-65, In Spanish.

The geographic position and historico-legal events involving Chile with Antarctica are reviewed, as are the beginnings of whaling and sealing activities in general, and Chile's antarctic expeditions in particular. Included are lists of Chilean bases and refuges in Antarctica from the Capitán Arturo Prat naval base built in 1947 to the Teniente Rodolfo Marsh Martin air base built in 1980, and of Chilean participation in rescue operations involving other nations.

M-31348

Pinochet de la Barra, O., **Historic records of Chilean international policies in Antarctica. 1906, 1907 amd 1908 negotiations between Chile and Argentina** [Antecedentes históricos de la politica internacional de Chile en la Antártica. Negociaciones chileno-argentinas de 1906, 1907 y 1908], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.67-80, In Spanish.

Legal precedents are traced from the 15th century onward to establish Chile's inheritance of Spanish colonial titles to the disputed portions of the Antarctic to which Great Britain, Argentina and Chile all claim sovereignty. A detailed account is given of the failed negotiations of 1906-1908 between Chile and Argentina to agree on an antarctic boundary between them, and of the events ending in an undefined-boundary-zone agreement in 1948.

M-31349

Gajardo Villaroel, E., **Records of the diplomatic negotiations prior to the 1959 Treaty and Chile's position** [Antecedentes de la negociación diplomatica previa al Tratado de 1959 y la posición de Chile], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.81-87, In Spanish.

Events leading up to the Antarctic Treaty are reviewed, as are justifications for jurisdiction over antarctic areas claimed by Chile, the 1947 antarctic agreement between Chile and other South American countries known as the "Interamerican Mutual Assistance Treaty", and the interests in Antarctica by other nations which led to the signing of the Antarctic Treaty in 1959.

M-31350

Pinochet de la Barra, O., **Chile's contribution to the Antarctic Treaty** [La contribución de Chile al Tratado Antártico], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.89-100, In Spanish.

The inception of the Antarctic Treaty is described by a member of the Chilean delegation to the Antarctic Treaty Conference in October 1959, from his notes and memories. The provisions of the Treaty and the role of Chile in promoting the protection and conservation of the antarctic environment are reviewed. In connection with the possible revision of the Treaty the author strongly advocates the continuation of peaceful international cooperation in antarctic research with no space or time limit.

M-31351

Riesco, R., **Antarctic geography as a basis of new political orientations** [La geografía antártica como base de nuevas orientaciones políticas], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.103-113, In Spanish.

Antarctica and the South Pacific Ocean are discussed as a geographic and economic unit in what the author terms the "modern political-spatial concept of the industrialized world". Territorial domination of Antarctica, with its potential for economic exploitation and possible use as a base for intercontinental nuclear missiles, signifies to the author a definite alteration of the political, economic and military power which exists in the world today. From the perspective of political geography, Antarctica has reached Ratzel's premise of being "known, inhabited, and politically significant", thus capable of an outward action. Since the austral zone of South America represents a way of access to the antarctic continent, the author urges Chile and Argentina to develop a joint geopolitical awareness of their strategic advantages.

M-31352

Poupin Berttoni, M., **Populating Antarctica** [Poblamiento antártico], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.115-118, In Spanish.

Of approximately 40 inhabited centers in Antarctica with their primarily coastal location, the author defines 3 as "head-centers" for their connective function with the rest of the world through their inter- and intracontinental accessibility and their nearness to antarctic land and sea resources. The three stations so defined are the Molodezhnaya, McMurdo and Teniente Rodolfo Marsh. The traditional policy of coadministration of the antarctic continent by various nations, while populating only the area that each nation claims as its own, is advocated.

M-31353

Pincheira, G.V., **Scientific research as basis of antarctic national policy** [La investigación científica como fundamento de una política nacional antártica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.121-130, In Spanish.

A brief history of antarctic research is given, describing the inception of SCAR, the various challenges that researchers find in Antarctica, the current involvements—particularly that with krill—and the prospects for the next few years, prior to the possible revision of the Antarctic Treaty. It is believed that Chile must develop a national policy regarding Antarctica based on more intense scientific and technical exploration of the international problems and in agreement with Chile's foreign policy.

M-31354

Ramírez Aranda, L., **SCAR and the development of scientific cooperation** [El SCAR y el desarrollo de la cooperación en materia científica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.131-146, In Spanish.

The history of the first and second International Polar Year and the International Geophysical Year of 1957-58, is outlined. Described in greater detail are the inception, constitution, organization and administration, regulations, and meetings of SCAR and the activities of its Groups of Specialists and Working Party subcommittees. The cooperation between the Antarctic Treaty system and SCAR, with regard to the protection and conservation of the antarctic environment, and the exploitation of its mineral and living resources, are discussed.

M-31358

Ariel Gallardo, V., **Environmental impact of possible antarctic mineral resource development** [El impacto ambiental del posible desarrollo de los recursos minerales antárticos], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.191-222, In Spanish. 42 notes and refs.

Environmental considerations in the articles of the Antarctic Treaty are discussed, and the recommendations for conservation of the antarctic flora and fauna, presented by SCAR's biology Working Party and at various Consultative Meetings, are reviewed. The areas identified by the Group of Specialists on Environmental Impact Assessment of Mineral Resource Exploration and Exploitation in Antarctica as requiring major study—such as the reaction of the antarctic ice cover to pollution, topographic maps of antarctic permafrost, radiation, ocean and atmospheric circulation among them—are listed. It is concluded that the knowledge of the antarctic ecosystem now available is not sufficient to permit an adequate prediction of the environmental impact that mining would have in Antarctica. It is, therefore, recommended that all nations, Chile in particular because of its proximity to the area of interest, conduct experimental research in subantarctic regions rather than on the continent itself.

M-31359

Infante Caffi, M.T., **Antarctic mineral resources and their regime** [Los recursos minerales antárticos y su régimen], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.225-236, In Spanish.

The discussion centers on Article IV of the Antarctic Treaty in relation to options of an antarctic national policy applicable to mineral resources. The problem of sovereignty in Antarctica is stressed and some ways in which it might be resolved are suggested. The history of Consultative Party recommendations at various conventions promulgated over the years is traced, and the conclusion is reached that agreement among consultative parties of the Treaty is indispensable for the establishment of a future minerals regime within the principles of the Treaty. The salient points of the elements defining the minerals regime are listed as: general obligations regarding the Antarctic Treaty; participating institutions; definition of stages and regulatory functions within the regime; other elements relevant to internal accommodation.

M-31360

Cabezas Bello, R., **Policy alternatives for the utilization of antarctic living marine resources** [Alternativas de políticas para la utilización de los recursos vivos marinos antárticos], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.237-248, In Spanish., In Spanish. Refs. p.246-248.

Various alternatives are evaluated to determine the course of activities aimed at insuring the achievement of Chile's political, strategic and economic objectives regarding Antarctica. The discussion centers on the national and international exploitation of krill from the fishing, industrial, commercial, legal and administrative-feasibility points of interest. The policies proposed cover the areas of production, promotion, infrastructure, research, and management of antarctic fishing in agreement with the regimes of the law of the sea and those established by the Antarctic Treaty.

M-31361

Berguño, J., **Acceptability criteria of an antarctic minerals regime** [Criterios de aceptabilidad en un régimen para los minerales antárticos], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.249-274, In Spanish.

Potential antarctic mineral resources are reviewed, as are the recommendations for a minerals regime regarding their exploration and exploitation promulgated by consultative parties at various meetings over the years. Among these recommendations, four solutions proposed for the problem of territorial claims are cited: agreement on the distribution of sovereignties; condominium of claimant nations; common human patrimony administered by the United Nations; and original statute. Some of the guiding principles to resolve a plurality of alternatives toward an acceptable regime include: conservation of peace, options, environment, and diversity; respect for other peaceful and legal uses of Antarctica; and support of scientific research.

M-31362

Zegers Santa Cruz, F., **International community and Antarctica** [La Comunidad Internacional y la Antártica], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.277-287, In Spanish.

A brief recapitulation of the interest in austral regions shown by many nations throughout history is presented, connecting it to the present legal regime governing Antarctica: the Antarctic Treaty. The debate concerning the Treaty at the 38th General Assembly of the United Nations, the preparation of an antarctic minerals regime, and the adaptation of the Treaty System are discussed in detail and cited as evidence of the growing international interest in Antarctica, the participation in its legal regime, and the exploitation of its resources.

M-31363

Armanet Armanet, P., **Antarctica and disarmament** [La Antártica y el disarme], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.289-294, In Spanish.

Antarctica's incorporation into the international system, the Antarctic Treaty and its implications regarding peace and cooperation among nations, and the future of Antarctica as a zone of peace, are discussed.

M-31364

Valenzuela, J.G., **Chile's antarctic policy and the bases of an administrative structure** [La política antártica chilena y las bases de una estructura administrativa], Política antártica de Chile, edited by F. Orrego Vicuña, M.T. Infante Caffi, and P. Armanet Armanet, Santiago de Chile, Universidad de Chile, 1984, p.297-305, In Spanish.

The structure of Chile's Antarctic Policy Council, formed in 1978, is discussed and an organization chart of related institutions and dependencies which, through Chile's Ministry of Foreign Affairs, deal with antarctic matters, is presented. Some criteria for organizing antarctic internal and external policies are suggested.

M-31417

Romero J., P., **Twenty-fifth anniversary of the Antarctic Treaty** [25o aniversario del Tratado Antártico], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July Dec. 1984 4(2), p.12-13, In Spanish.

A brief history of the Antarctic Treaty is presented, with a review of its articles and recommendations concerning territorial claims, consultative status, peace, and research, and emphasis on the treaty's significance as a legal and scientific instrument.

M-31418
Riesco, R.J., **Austral and antarctic geopolitics** [Geopolítica austral y antártica], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.14-17, In Spanish. Originally published in 'El Mercurio de Santiago', May 29, 1984.

In this article the jurisdiction of the Antarctic Treaty, the geographic implications of the Treaty on the law of the sea, the percentage of global mineral reserves located in the Pacific Ocean, and the geopolitical perspective of Antarctica and the South Pacific Ocean as a unit, are discussed. Reference is made to Soviet concern over Chile's austral and antarctic activities.

M-31422
Valle, J. del, **Antarctic Treaty: example of international cooperation** [Tratado Antártico: ejemplo de cooperación internacional], *Santiago de Chile. Instituto Antártico Chileno. Boletín antártico chileno,* July-Dec. 1984 4(2), p.35-40, In Spanish.

This is the complete text of a talk given by Chile's Minister of Foreign Affairs at a ceremony held at the University of Chile to commemorate the 25th anniversary of the signing of the Antarctic Treaty. The past and present Chilean political and scientific involvements in Antarctica are emphasized, and their national as well as international character is pointed out. The significance of the Antarctic Treaty is discussed in detail.

M-31476
Campos Pardo, O.A., **Antarctica, cold region of fiery, red-hot politics** [Antártida, región fría de política encendida, casi candente], *Antártida,* May 1982 No.12, p.4-7, 59, In Spanish.

The 11th Consultative Meeting of the Antarctic Treaty members, held in Buenos Aires June 23-July 7, 1981, and the preparatory meetings preceding it, as well as those following it, are reviewed. The highlights of the discussions, reflecting the economic and political interest of many nations in Antarctica, are presented.

M-31640
Yoshida, S., **Political environment surrounding antarctica** [Nankyoku o torimaker seiji kankyo], *Chiri,* March 1983 38(3), p.61-65, In Japanese.

The history of discovery of Antarctica and of its exploration and exploitation is reviewed, especially in relation to the various territorial claims arising from it. The regime of the Antarctic Treaty and its various aspects are discussed.

M-31676
Margerum, A.L., **Multilateral cooperation in antarctic marine ecosystem research,** Seattle, University of Washington, 1982, 182p., Master of Marine Affairs thesis. With 2 appendixes. Notes and refs. passim. Bibliography p.152-160.

After the introductory first chapter, the discussion in Ch. 2 of this thesis covers the relationship of the Antarctic Treaty to the Convention on the Conservation of the Antarctic Marine Living Resources; the living and mineral antarctic resources; the nations and organizations involved in Antarctica; and the evolution of the BIOMASS program with current and future plans for marine ecological research in the southern ocean. Principles for effective international scientific programs are discussed in Ch. 3. Chapter 4 is an analysis of five alternatives for facilitation of marine ecosystem research in the southern ocean. United States antarctic policy and the organization of funding mechanisms for U.S. antarctic marine ecological research relative to those five alternatives are discussed in Ch. 5. It is concluded that the Convention provides a beginning towards a more comprehensive management strategy for a balanced marine scientific research and economic and political interests in the southern ocean.

M-31725
Wolfrum, R., **Internationalization of common space outside national jurisdiction. Development of an international administration for Antarctica, outer space, high seas and seabed** [Die Internationalisierung staatsfreier Räume. Die Entwicklung einer internationalen Verwaltung für Antarktis, Weltraum, Hohe See und Meeresboden], Berlin, Springer, 1984, 757p. (Pertinent p.30-100), In German. English summary p.707-717. Refs. p.718-750.

DLC JX4173.W64

A review of a new development in the regimes governing the use of Antarctica, the high seas, the seabed and outer space—a development which departs from some of the established general principles of international law, and which will lead to a change in the functions of international organizations—is presented. An analysis of the Antarctic Treaty reveals that it only covers scientific research, prohibition of military activities and the protection of the antarctic environment. Its regulatory scope is quite limited compared to the law of the sea regime. However, the Antarctic Treaty taken as a unit with the supplementing resolutions of the Antarctic Consultative Parties makes up a legal framework imposing a set of obligations upon the States Parties which clearly serve community interests. To prove that the regimes governing the use of the high seas and of Antarctica reflect community interests, specific State obligations are reviewed.

See also:
A-29226 A-29309 A-30089 A-30441 A-30599 A-30858
A-31024 A-31242 B-29797 B-29981 B-31239 D-30880 G-30328
G-30562 G-31343

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